CHAPTER 2.0
ENVIRONMENTAL CONTEXT AND CONSEQUENCES

This chapter describes the existing conditions in the area potentially affected by the security action, and provides an impacts analysis of the security action on those conditions. As described in Chapter 1.0, the security action includes the May 20, 1995, vehicular traffic restriction on certain portions of streets contiguous to the perimeter of the White House Complex.

The extended study area for the assessment of impacts is located entirely in the northwest quadrant of the city and is bordered to the west by 23rd Street to the east by 12th Street, to the north by M Street, and to the south by Constitution Avenue. All references to streets in this document refer to those in the northwest quadrant. See Figure 2-1 for a map of the core and extended study areas. The extended study area was developed based on the determination of the area in which significant impacts on the human environment might be caused by changes in traffic flow as a result of the security action. The actual study area for the impacts analysis for each resource is dependent on the characteristics of the particular resource being analyzed, and is described below for each resource.

Because of the emergency nature of the security action, there was no opportunity for an organized data-collection effort prior to the action. The data used for this environmental assessment reflect the fact that the assessment was initiated after the security action traffic management responses. Only a limited amount of data describing conditions before the security action were available. Data describing conditions after the security action and traffic management responses are more complete and represent conditions after the traffic management responses was implemented.

The follow-up traffic management response was implemented on June 24 and 25, 1995, in response to the action described in Section 1.3. The DCDPW, Bureau of Traffic Services, modified street operations in the vicinity in an attempt to compensate for the reduction in east-west street capacity. H Street between Pennsylvania Avenue and New York Avenue was modified from a two-way street to a one-way eastbound street. I Street between Pennsylvania Avenue and New York Avenue was modified from a one-way eastbound street to a one-way westbound street. Fifteenth Street between New York Avenue/Pennsylvania Avenue and K Street was modified from a two-way street to a one-way northbound street. The June traffic management response actions, performed by the DCDPW, were classified under NEPA as Categorical Exclusions by the FHWA.

Figure 2-1: Study Area

The June traffic management response included allowing public vehicular access to the portion of Pennsylvania Avenue immediately west of 15th Street to provide direct access to the Pennsylvania Avenue entrances of the Riggs National Bank and NationsBank. On-street parking in front of the banks was permitted and a temporary turnaround was created on Pennsylvania Avenue.

2.1 PHYSICAL SETTING AND LAND USE

2.1.1 Affected Environment

2.1.1.1 Physical Setting

The site of the security action is bounded to the north by H Street, to the south by E Street, to the west by 17th Street, and to the east by 15th Street. The core study area is confined to the general area in which the security action took place. The extended study area comprises governmental, institutional, and commercial office buildings as well as public parkland, wide avenues, and open spaces associated with the Monumental Core. Washington, D.C. was founded as the home of the federal government. The design of the 1791 L'Enfant Plan for the city and the several refinement efforts that have followed have culminated in a city of impressive public buildings and plazas united by wide avenues and open spaces. Washington, D.C. is also the home for a large residential population, and the central city for a large and expanding metropolitan area.

2.1.1.2 Land Use

Land use in the area surrounding the site of the security action exemplifies the design of the L'Enfant Plan for the Federal City, a unique design for an American city. The extended study area incorporates a portion of the Monumental Core and the open spaces, public buildings, and plazas associated with the L'Enfant Plan. The extended study area also incorporates portions of a downtown urban business district that developed independent of the L'Enfant Plan. A map of general land use is provided in Figure 2-2.

The area surrounding the site of the security action to the north, northeast, east, and northwest of the White House comprises mostly commercial office buildings and retail establishments that constitute the downtown business district. Parks are interspersed in this area, as designed in the L'Enfant Plan. These parks include McPherson Square, Farragut Square, Franklin Square, Thomas Circle, and Washington Circle as well as small triangular parks created by the angled intersections of Pennsylvania Avenue with streets on the grid pattern.

Federal buildings surround the site of the security action and extend to the east and southeast in the Federal Triangle complex and to the west and southwest in the Foggy Bottom area. Federal buildings in the extended study area include the White House Complex, the Department of the Treasury, the Department of the Interior, the Federal Reserve Board, the Department of State, the Department of Commerce, the Department of Veterans Affairs, the Office of Personnel Management, the General Services Administration, and the Interstate Commerce Commission. Buildings in the area also house nongovernmental organizations and institutions such as the Organization of American States, the National Academy of Sciences, the International Red Cross Headquarters, the United Nations, the Pan American Health Organization, the World Bank, and the International Monetary Fund.

Small areas of residential land use exist in the far northeastern and northwestern portions of the extended study area. These are the southern fringes of residential areas that extend north of the extended study

area. Some residential buildings also exist in Foggy Bottom, west of the site of the security action. These buildings are mostly student housing for the George Washington University, which is also in this area. The southern portion of the extended study area borders open space associated with the National Mall, the Monumental Core, and the Smithsonian Institution.

The Washington, D.C. regional planning agency is the National Capital Planning Commission (NCPC). In *Comprehensive Plan for the National Capital: Federal Elements*, and *Extending the Legacy: Planning America's Capital for the 21st Century*, the NCPC presents concepts that would maintain, extend, and enhance the planning and design concepts that have shaped the development of the city for its 200 years. The NCPC plan was used as a source document for land use planning information.

2.1.2 Impacts Analysis

The removal of vehicular traffic from those streets in the location of the security action enhances the physical setting by reducing noise levels and emissions and providing better pedestrian access. This enhancement constitutes a beneficial impact only on those streets where vehicular traffic was restricted.

Because the extended study area is within a mature, developed urban environment that substantially limits land-use development or major changes, land uses are not expected to change substantially by any single influence. The security action, which resulted primarily in changes to the transportation system**,** has not changed the character of the surrounding land areas, nor will it affect the designated uses of the land as shown in Figure 2-2. The vehicular restrictions do not constitute a change in land use. These streets will continue to allow pedestrian and bicycle access.

The impacts of changes in noise levels and air quality in the extended study area and their corresponding effects on land use, including protected historic sites, are addressed in Section 2.3, Air Quality; Section 2.4, Noise; and Section 2.6, Cultural Resources, respectively.

Figure 2-2: General Land Use

2.2 TRAFFIC AND TRANSPORTATION ISSUES

2.2.1 Affected Environment

2.2.1.1 Before the Security Action

The transportation system in the vicinity of the White House includes the street and sidewalk network, a segment of the Metrorail regional rail transit system, Metrobus routes, and both on- and off-street parking. Major uses of the transportation system include not only the general personal travel and goods movement that would exist in any city but also a large number of tourists and related activities. Characteristics of the transportation system were documented in the report, *Analysis of Transportation Conditions After Traffic Restriction and Street Modifications in the Vicinity of the White House*, published by the Federal Highway Administration in May 1997, and referred to here as the FHWA transportation analysis. The following information is derived from that analysis.

Street Network

The street network is a portion of the urban grid in downtown Washington, including east-west and north-south streets and diagonal avenues. The network is less dense than in most of downtown Washington because the White House grounds and Lafayette Square are larger than the typical downtown block. The street network reflects the L'Enfant Plan concept for Washington D.C., although operational changes, including a variety of traffic restrictions and one-way operations have been made to some streets over the years. Pennsylvania Avenue between 15th and 17th Streets was not in the L'Enfant Plan; this segment of the avenue was officially added in 1824. Lower E and F Streets west of the White House and I and L Streets had been made one-way eastbound streets. Upper E and G Streets west of the White House and M Street had been made one-way westbound. In addition, 12th, 18th, 20th, and 22nd Streets were one-way northbound and 19th and 21st Streets were one-way southbound. Portions of Connecticut Avenue and 15th and 17th Streets operated as one-way streets during some hours on weekdays. Traffic had already been restricted on other streets in the vicinity of the White House, as described in Chapter 1.0.

Traffic Volumes

Traffic data for conditions before the security action are not complete because there was no opportunity for the systematic collection of data before the security action. Some historic traffic data exist and were used to the extent possible. The most recent average weekday traffic volumes that are available for the downtown area before the action are from DCDPW counts in 1993. No comprehensive, consistent set of intersection turning-movement data are available, but traffic counts taken between June 1990, and January 1995, are available for 16 intersections in the extended study area.

Before the security action, the streets that were affected carried high volumes of traffic. The 1993 daily traffic volumes show the magnitude of these traffic flows. The east-west streets between and including K Street and Constitution Avenue carried 143,000 vehicles on an average weekday (based on 1993 counts). Pennsylvania Avenue carried about 26,000 vehicles per day and westbound E Street carried about 12,000, for a total of approximately 38,000 vehicles per day. This was 26.5 percent of the average weekday east-west traffic between K Street and Constitution Avenue. H and I Streets together carried 27,500 vehicles, or 19.2 percent of the traffic. Table 2-1, drawn from the FHWA transportation analysis, shows historical average weekday east-west traffic volumes.

Table 2-1
Average Weekday East-West Traffic Volumes Before the Security Action[1/]

Street	AWT (thousands)	Percent
K Street	25.5	17.8%
I Street	13.5	9.4%
H Street	14.0	9.8%
Pennsylvania Avenue	26.0	18.1%
E Street	23.0	16.1%
Constitution Avenue	41.2	28.8%
Total	**143.2**	**100.0%**

Source: DCDPW, Bureau of Traffic Services 1993, AWT
AWT - average weekday traffic volumes
[1/] between 15th and 17th Streets

Public Transportation

Public transportation services in the extended study area include the Metrorail Red Line, which runs under Connecticut Avenue, Lafayette Square, and G Street, and the Orange and Blue lines, which run under I Street. Metrobus routes operated on many of the streets in the extended study area. Nine Metrobus routes operated on Pennsylvania Avenue between 15th and 17th Streets before the security action. One additional route used Madison Place and Pennsylvania Avenue between Madison and 15th Street. The Washington Metropolitan Area Transit Authority (WMATA) reported that the total daily number of bus trips on the routes at the time of the security action was 497 on each weekday, 310 on Saturday, and 222 on Sunday.

Tourbuses

Because of the attraction of the White House to tourists, many tour buses operate in the area, although no data on their numbers exist. The FHWA transportation analysis describes two basic types of tour-bus operations in the vicinity of the White House. One type is a scheduled service on a fixed route that in some cases combines sight-seeing opportunities with a local-circulation service among tourist sites. The second type is a group tour that typically operates on a less rigid schedule or no set schedule, and provides access to the tourist sights for a designated group of people. This second type of operation includes charter operations that bring people to Washington from outside the area as well as local operations that provide regular sight-seeing tours for residents and tourists who have arrived by other means.

Buses in each type of operation traveled on both Pennsylvania Avenue and E Street to provide views of the White House and in some cases to serve as a drop-off location for people who wished to walk around the area. Some group-tour operators take each group to a tourist site such as the White House and allow the group time off the bus at that location while the bus waits for them. Bus parking close to tourist sites is one of the most important needs for these group-tour operators.

Parking and Building Access

One of the important functions of the downtown street system is to provide vehicular access to buildings, both for the commercial vehicles making deliveries to business establishments and for parking private vehicles. The FHWA transportation analysis found that the number of parking meters on the streets within the area of the vehicular traffic restriction or operational modifications was 1,610 before the security action. In the vicinity of the White House, there are 23 off-street parking lots or garages, operated by at least 12 parking operators.

2.2.1.2 After the Security Action

The May 20, 1995, security action restricted vehicular traffic on certain portions of streets contiguous to the perimeter of the White House Complex. Metro buses were allowed to operate on Madison Place following the security action until June 1996. Pedestrian and bicycle traffic was not restricted.

On June 24 and 25, 1995, the District of Columbia Department of Public Works (DCDPW), Bureau of Traffic Services, implemented a set of traffic management response actions. These included modifications to street operations in the vicinity in an attempt to compensate for the reduction in east-west street capacity. H Street between Pennsylvania Avenue and New York Avenue was modified from a two-way street to a one-way eastbound street. I Street between Pennsylvania Avenue and New York Avenue was modified from a one-way eastbound street to a one-way westbound street. Fifteenth Street between New York Avenue / Pennsylvania Avenue and K Street was modified from a two-way street to a one-way northbound street. Later, DCDPW returned 15th Street to two-way traffic south of H Street to reduce traffic congestion and to accommodate revised Metrobus routes due to the closure of Madison Place.

The June traffic management response actions included allowing public vehicular access to the portion of Pennsylvania Avenue immediately west of 15th Street to provide direct access to the Pennsylvania Avenue entrances of the Riggs National Bank and NationsBank. On-street parking in front of the banks was permitted and a temporary turnaround was created on Pennsylvania Avenue. There is more parking in this area now than there was before the security action.

2.2.2 Impacts Analysis

2.2.2.1 Analysis of Impacts on Traffic Patterns

The vehicular traffic restriction on Pennsylvania Avenue and E Street caused the shift of east-west traffic from these streets to other east-west streets in the area. The 24-hour traffic counts conducted in July 1995, described in the FHWA transportation analysis, indicate that the primary east-west streets through the extended study area carried approximately 157,600 vehicles per day, approximately 9.5 percent more than the 1993 average weekday volume of 143,200. This increase is unrelated to the security action. To allow a comparison of the percent change in the volume on each primary street in the downtown, the 1993 average weekday volumes were adjusted in the FHWA transportation analysis to reflect July traffic conditions, with the assumption that downtown seasonal traffic patterns have been consistent over the past few years.

Table 2-2, reproduced from the FHWA transportation analysis, shows traffic volumes before and after the security action and the traffic management responses. The table also shows the change in traffic on each primary east-west street between Constitution Avenue and K Street. The 1993 data describing conditions before the security action were adjusted in the FHWA transportation analysis to allow comparisons with the counts taken after the security action and traffic management responses in 1995. The changes in traffic volumes indicate the shifts in overall traffic patterns.

Table 2-2 shows that the largest increase in traffic occurred on Constitution Avenue, which carries an

additional 23,000 vehicles, or approximately 50 percent more than before the security action. The H and I Streets one-way pair had a 34 percent increase and K Street a 31 percent increase. Constitution Avenue and K Street presently carry over two-thirds of the east-west traffic, as compared to slightly less than one-half prior to the security action. These new patterns of traffic are consistent for daily, morning, midday, and afternoon conditions.

Table 2-2
Changes in Traffic Volumes on Primary East-West Streets[1/]

	Before[2/]		After		Change	
Street	**AWT**	**Percent**	**AWT**	**Percent**	**AWT**	**Percent**
K Street	28.1	17.8%	36.5	23.2%	+ 8.4	+31.1%
H Street & I Street	30.2	19.2%	40.7	25.8%	+10.5	+34.4%
Pennsylvania Avenue	28.7	18.2%	0.0	0.0%	-28.7	-100.0%
E Street westbound	13.2	8.4%	0.0	0.0%	-13.2	-100.0%
E Street eastbound	12.0	7.6%	12.0	7.6%	0.0	0.0%
Constitution Avenue	45.4	28.8%	68.4	43.4%	+23.0	+50.7%
Total	157.6	100.0%	157.6	100.0%		

AWT average weekday traffic volume in thousands
[1/] Between 15th and 17th Streets
[2/] Adjusted to 1995 traffic conditions

Traffic on the primary north-south streets also shifted because of the security action and the traffic management responses. Table 2-3, also reproduced from the FHWA transportation analysis, shows traffic volumes before and after the security action and traffic management responses, and the change in traffic, on the primary north-south streets where traffic information was available, from 11th Street on the east to 21st Street on the west.

As expected, Table 2-3 indicates that the shifts in traffic among the north-south streets were smaller than the shifts among the east-west streets. Although 15th Street was modified from a two-way to a one-way northbound street between Pennsylvania Avenue and K Street, it carries about the same number of vehicles as when it had two-way flow. Fourteenth Street had the greatest change in the number of vehicles, probably due to the loss of southbound travel on 15th Street. There was some shifting of north-south traffic on the streets between 18th and 21st Streets; however, the total percentage of traffic carried by these four streets remained consistent.

The FHWA transportation analysis includes an assessment of potential effects of the security action and the traffic management responses on the transportation system beyond the immediate vicinity of the changes. This analysis was performed to determine whether drivers would make large diversions in their travel patterns to avoid the area where the vehicular traffic restriction is in effect. Only insignificant effects would be found beyond the extended study area, which was the same area analyzed in this EA.

Table 2-3
Changes in Traffic Volumes on Primary North-South Streets [1/]

	Before[2/]		After		Change	
Street	**AWT**	**Percent**	**AWT**	**Percent**	**AWT**	**Percent**

11th Street	15.0	8.6%	16.0	9.2%	+1.0	+7.0%
12th Street	15.0	8.7%	15.3	8.8%	+0.3	+1.1%
13th Street	19.3	11.1%	10.9	6.1%	-8.4	-43.3%
14th Street	31.0	17.9%	37.6	21.7%	+6.6	+21.2%
15th Street	15.0	8.7%	14.4	8.3%	-0.6	-4.6%
17th Street	24.0	13.8%	26.0	15.0%	+2.0	+8.7%
18th Street	15.3	8.8%	18.9	10.9%	+3.6	+23.9%
19th Street	13.0	7.5%	18.0	10.4%	+5.0	+38.7%
20th Street	17.0	9.8%	9.0	5.2%	-8.0	-47.1%
21st Street	8.8	5.1%	7.3	4.2%	-1.5	-17.7%
Total	173.4	100.0%	173.4	100.0%		

AWT average weekday traffic volume in thousands
1/ Between New York and Pennsylvania Avenues
2/ Adjusted to 1995 traffic conditions

2.2.2.2 Analysis of Impacts on Traffic Operations

The ability of a street system to accommodate the traffic demand upon it is expressed as the level of service (LOS). The FHWA transportation analysis calculated levels of service based upon average travel times along streets in the extended study area. This method of calculating LOS is appropriate in an urban center. Where intersections are close together, their operation affects each other, and LOS cannot be calculated using the traffic volumes at individual intersections or on street segments. Levels of service must be calculated in a way that reflects the interaction of different parts of the street system.

For the FHWA analysis, travel-time speed-and-delay studies were performed to calculate the level of service on 14 east-west and north-south streets in the extended study area during the summer of 1995. Travel-speed data could be collected only for conditions after the security action and the traffic management responses; no travel-speed data exist for conditions before the security action and traffic management responses. Because levels of service could not be calculated for the conditions before the security action and traffic management responses, comparisons between the levels of service before and after the security action and the traffic management responses cannot be made.

Level of service describes traffic operations using letter grades from *A* through *F*. *LOS A*, the highest level, describes free-flowing operations at average travel speeds, where vehicles are completely unimpeded in their ability to maneuver in the traffic stream. *LOS B* represents reasonably unimpeded operations at average travel speeds, where the ability to maneuver within the traffic stream is only slightly restricted and the stopped delays at intersections are not bothersome. *LOS C* represents stable operation, but the ability to maneuver and change lanes may be more restricted and average travel speeds are about 50 percent of the average free-flow speed. In *LOS D*, small increases in flow may cause substantial increases in delay, and reductions in speed. *LOS E* is characterized by substantial delays and average travel speeds of one-third the average free-flow speed or less. A street operates at LOS E when traffic volumes are approximately equal to the street's traffic capacity. *LOS F* characterizes traffic flow at extremely low speeds below one-third to one-quarter of the average free-flow speed, with high delays and extensive queuing at intersections. Traffic demand on a street operating at LOS F exceeds the street's traffic capacity.

In urban centers such as Washington's, some congestion is both normal and inevitable. Standard traffic

engineering practice considers LOS E or better to be acceptable even though LOS E represents at-capacity operation. LOS F is undesirable.

Table 2-4 defines the relationship between level of service and average through vehicle speed on streets that have a 25 mile-per-hour speed limit, which is defined as arterial class III. All non-posted streets in the District of Columbia are to operate at 25 miles per hour. None of the primary streets in downtown Washington was observed to have a posted speed limit.

Table 2-4
Relationship of Street Level of Service to Average Travel Speed, Arterial Class III

Level of Service	Average Speed (mph)
A	≥25
B	≥19
C	≥13
D	≥9
E	≥7
F	< 7

Source: *Highway Capacity Manual, 3rd Edition, Updated 1994*

The data collected in the travel-time speed-and-delay studies were used to calculate average travel speed, total travel times, and average stopped delay (defined as the time when a vehicle is traveling less than five miles per hour). The average travel speeds were used to calculate levels of service for the morning peak period, the midday period and the afternoon peak period, which are shown in Table 2-5.

Figures 2-3 through 2-5 illustrate the level of service by street segment for each of the periods.

Table 2-5
Summary of Street Levels of Service Based Upon Travel Speed

Street	A.M. Peak Period		Mid-Day Period		P.M. Peak Period	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
Constitution Avenue Eastbound						
23rd St. to 17th St.	31.1	A	21.3	B	14.9	C
17th St. to 12th St.	17.5	C	20.1	B	14.3	C
Constitution Avenue Westbound						
12th St. to 17th St.	14.9	C	29.9	A	14.5	C
17th St. to 23rd St.	26.1	A	29.1	A	15.9	C
E Street Eastbound						
20th St. to 17th St.	6.8	F	9.4	D	5.7	F
17th St. to 15th St.	25.0	A	20.5	B	5.0	F
E Street Westbound						
17th Street to 20th Street	16.8	C	16.3	C	12.0	D

Street	A.M. Peak Period		Mid-Day Period		P.M. Peak Period	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
(E) Pennsylvania Avenue Eastbound						
15th St. to 12th St.	18.3	C	16.9	C	7.2	E
(E) Pennsylvania Avenue Westbound						
12th St. to 15th St.	13.8	C	14.7	C	18.1	C
(W) Pennsylvania Ave Eastbound						
22nd St. to 17th St.	8.0	E	18.6	C	12.4	D
(W) Pennsylvania Ave Westbound						
17th St. to 22nd St.	10.8	D	9.7	D	12.7	D
H Street						
Penn. Ave. to 16th St.	7.5	E	12.4	D	15.5	C
16th St. to New York Ave.	14.2	C	18.2	C	4.0	F
I Street						
New York Ave. to 16th St.	5.1	F	5.5	F	11.4	D
16th St. to Penn. Ave.	8.0	E	3.7	F	5.5	F
K Street Eastbound						
21st St. to 16th St.	8.6	E	8.4	E	4.0	F
16th St. to 11th St.	9.9	D	10.3	D	10.6	D
K Street Westbound						
11th St. to 16th St.	11.8	D	10.6	D	8.7	E
16th St. to 21st St.	9.3	E	11.0	E	11.6	D
L Street						
23rd St. to Conn. Ave.	9.9	D	6.7	F	7.5	E
Conn. Ave. to 12th St.	17.3	C	10.4	D	8.6	E
M Street						
14th St. to Conn. Ave.	9.2	D	8.0	E	12.3	D
Conn. Ave. to 23rd St.	21.0	B	9.9	D	13.2	C
13th Street Northbound						
Penn. Ave. to New York Ave.	6.1	F	7.0	F	11.6	D
New York Ave. to K St.	18.8	C	9.3	D	7.0	F
K St. to Mass. Ave.	8.4	E	12.0	D	21.1	B
13th Street Southbound						
Mass. Ave. to K St.	6.9	F	8.2	E	7.2	E

Street	A.M. Peak Period		Mid-Day Period		P.M. Peak Period	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
K St. to New York Ave.	6.1	F	6.3	F	10.0	D
New York Ave. to Penn. Ave.	14.5	C	17.7	C	9.9	D
14th Street Northbound						
Const. Ave. to Penn. Ave.	8.0	E	10.9	D	14.3	C
Penn. Ave. to New York Ave.	4.8	F	9.6	D	17.4	C
New York Ave. to K St.	7.1	E	10.4	D	9.9	D
K St. to Thomas Circle	7.8	E	15.8	C	9.1	D
14th Street Southbound						
Thomas Cir. to K St.	8.6	E	14.4	C	9.3	D
K St. to New York Ave.	7.8	E	12.5	D	8.3	E
New York Ave. to Penn. Ave.	8.8	E	7.8	E	5.5	F
Penn. Ave. to Const. Ave.	19.5	B	12.8	D	12.0	D
15th Street and Vermont Avenue Northbound						
Const. Ave. to Penn. Ave.	16.0	C	12.1	D	12.4	D
Penn. Ave. to New York Ave.	8.6	E	8.8	E	19.4	B
New York Ave. to K St.	7.0	F	8.6	E	7.5	E
K St. to Thomas Circle	6.4	F	11.6	D	11.2	D
15th Street Southbound						
New York Ave. to Penn. Ave.	10.7	D	10.5	D	13.3	C
Penn. Ave. to Const. Ave.	13.6	C	13.4	C	15.3	C
17th Street and Connecticut Avenue Northbound						
Const. Ave. to New York Ave.	6.8	F	17.0	C	14.7	C
New York Ave. to Penn. Ave.	10.7	D	17.9	C	10.4	D
Penn. Ave. to I St.	7.0	E	6.0	F	12.2	D
I St. to K St.	17.3	C	13.4	C	2.5	F
K St. to M St.	7.9	E	8.0	E	11.8	D
17th Street and Connecticut Avenue Southbound						
M St. to K St.	7.0	E	9.7	D	8.0	E
K St. to I St.	13.2	C	3.9	F	3.7	F
I St. to Penn. Ave.	7.3	E	8.2	E	4.2	F
Penn. Ave. to New York Ave.	14.1	C	10.1	D	11.1	D
New York Ave. to Const. Ave.	19.0	C	6.6	F	15.6	C
18th Street						
Const. Ave. to New York Ave.	20.9	B	14.4	C	20.9	B
New York Ave. to Penn. Ave.	7.6	E	12.2	D	10.1	D
Penn. Ave. to K St.	8.6	E	7.1	E	12.8	D
K St. to M St.	8.1	E	12.2	D	9.4	D
19th Street						

Street	A.M. Peak Period		Mid-Day Period		P.M. Peak Period	
	Speed (MPH)	LOS	Speed (MPH)	LOS	Speed (MPH)	LOS
M St. to K St.	13.0	D	6.0	F	6.0	F
K St. to Penn. Ave.	12.7	D	6.3	F	6.1	F
Penn. Ave. to E St.	15.1	C	13.2	C	22.3	B
E. St. to Const. Ave.	14.5	C	29.1	A	18.4	C

MPH - Miles per hour
LOS - Levels of service

Figure 2-3: Street Levels of Service After Security Action and the Traffic Management Responses - AM Peak Period

Figure 2-4: Street Levels of Service After Security Action and the Traffic Management Responses - Midday Period

Figure 2-5: Street Levels of Service After Security Action and the Traffic Management Responses - PM Peak Period

Traffic Conditions in the Extended Study Area

Based on observation and available pre-action data, there were traffic operations problems on streets in the extended study area before the security action. The shift in traffic caused by the security action worsened those problems, especially on the east-west streets that gained traffic. The change in traffic volumes can be estimated from available data, but the effect on operations problems cannot, because the performance of an urban street system where intersections are close together is a complex function of more than traffic volumes alone. The degree to which the security action and the traffic management responses contributed to traffic operations problems cannot be determined.

Even though the east-west streets were most affected by the security action, changes in traffic also affect the north-south streets. Changes on the east-west streets would cause shifts in overall travel patterns that would increase or decrease traffic volumes on north-south streets, as drivers changed their travel paths through downtown. The streets interact as a system; changes that directly affect one part of that system can also generate effects in other parts of the system.

For east-west streets, the travel-time speed-and-delay studies and observations identified these conditions after the security action and the traffic management responses:

- ***M Street*** East of Connecticut Avenue, levels of service on M Street range from D to the high end of E during the three time periods. West of Connecticut Avenue, the level of service is better in each period, ranging from B to D. In each segment, the worst conditions occur in the midday period.

- ***L Street*** During the morning peak period, vehicles traveling on L Street have levels of service C and D. During the midday period, the loss of two travel lanes because of on-street parking and double-parked commercial vehicles reduces the effectiveness of the two remaining through lanes, resulting in LOS E, at-capacity traffic conditions.

  Traffic in the afternoon peak period operates at LOS E, at-capacity conditions, all along this street. Because the congestion on eastbound K Street during the afternoon peak hours, some vehicles probably have diverted to L Street. The L Street average travel speed is marginally faster than the eastbound K Street travel speed.

- ***K Street*** Both directions of travel are at LOS D or worse during the three time periods. Eastbound afternoon travel between 21st and 16th Streets typically has the worst congestion, reaching LOS F. Left-turn movements from K Street to 17th Street (East) and bus circulation between Connecticut Avenue and 17th Street (East) contribute to the overall low travel speeds and high amounts of stopped delays.

- ***I Street*** Vehicles traveling on I Street between New York Avenue and Pennsylvania Avenue have the slowest travel speeds and very high stopped delays during all time periods. Overall travel speeds considering stopped delays are typically less than 10 miles per hour and levels of service are D or worse. During the midday period, the average stopped time is 70 percent of the total trip time. This high delay is typically due to commercial vehicles double parking on I Street, resulting in the loss of a travel lane. Midday travel on I Street is slower than during the morning and afternoon peak periods.

- ***H Street*** H Street between Pennsylvania Avenue and 16th Street operates at LOS E or better during all periods. Between 16th Street and New York Avenue, H Street operates at level of

service F in the afternoon peak period. Most of the delay and low travel speeds during this time period are at the 14th Street and New York Avenue intersection.

- ***Constitution Avenue*** Average levels of service are C or better in both directions during the three time periods. However, westbound traffic in the two travel lanes destined to the Arlington Memorial Bridge via Henry Bacon Drive experience lower levels of service during the afternoon peak period.

For the key north-south streets, too, some operational problems existed previously. The degree to which the security action and the traffic management responses contribute to the problems cannot be determined because of lack of data on conditions before the security action. The travel-time speed-and-delay studies and observation identified these conditions after the security action and the traffic management responses:

- ***19th Street*** Southbound traffic on 19th Street north of Pennsylvania Avenue operates at LOS D during the morning peak period. Traffic leaving downtown during the midday and afternoon peak periods experiences LOS F. Conditions are better south of Pennsylvania Avenue, LOS C or better.

- ***18th Street*** Northbound traffic on 18th Street north of New York Avenue is at LOS E during the morning peak period, LOS D and E during the midday period, and LOS D during the afternoon peak period.

- ***17th Street*** Traffic on 17th Street and Connecticut Avenue operates at LOS C or worse in all three periods. In the morning peak period, northbound 17th Street between Constitution Avenue and New York Avenue operates at LOS F. In the midday period, northbound traffic between Pennsylvania Avenue and I Street and southbound traffic between New York Avenue and Constitution Avenue operate at LOS F. In the afternoon peak period, northbound traffic between I and K Streets and southbound traffic between K Street and Pennsylvania Avenue operates at LOS F.

- ***15th Street*** Southbound traffic south of New York operates at LOS D or better during all time periods. At the time the post-action data were collected, the one-way northbound section of 15th Street between New York Avenue and K Street operated at LOS F in the morning peak period. The section of 15th Street between New York Avenue and H Street was later changed to two-way operation.
- ***14th Street*** LOS E generally exists in both directions during the morning peak period, although the northbound section between Pennsylvania Avenue and New York Avenue is at LOS F. LOS C, D and E exist during the midday period. During the afternoon peak period, northbound traffic operates at LOS C and D and southbound traffic operates at LOS D and E, except for the section between New York and Pennsylvania Avenues, which is at LOS F. During all time periods, motorists traveling southbound on 14th Street between New York Avenue and Pennsylvania Avenue experience the lowest travel speeds and the longest stopped delays.

- ***13th Street*** At least one section of 13th Street is at LOS F in each time period. In the morning peak period, northbound traffic from Pennsylvania Avenue to New York Avenue and southbound traffic from Massachusetts Avenue to New York Avenue are at LOS F. In the afternoon peak period, only northbound traffic from New York Avenue to K Street is at LOS F.

2.2.2.3 Analysis of Impacts on Tour Buses

The FHWA transportation analysis found that the tour-bus operators who provided information said that they had previously used Pennsylvania Avenue north of the White House as a location to provide views and photograph opportunities of the White House, and so had to change the locations for their operations in the area. Because there was no advance notice of the security action, the tour-bus operations were temporarily disrupted. Each operator had to devise new operating plans on short notice. Initially, all operations were slowed by the traffic congestion that resulted from the change, but the June traffic management response addressed this problem. However, operators stated that H and I Streets
where they can now operate are too far away to provide good views of the White House.

The security action and the traffic management responses increased the need for tour-bus parking. Some operators previously dropped tourists off on one side of Lafayette Park and then drove the buses around to the opposite side of the park while the tourists walked across it. Because Pennsylvania Avenue is no longer usable for buses, they must now wait in one location while people walk around the park. Tour operators reported different degrees of difficulty in finding parking locations. They reported parking on H Street and on 15th Street south of Pennsylvania Avenue, although tour bus parking on H Street is illegal. Long term tour bus parking needs should be addressed in a long term comprehensive plan that examines all tour bus requirements in the downtown area.

Many of the operators noted that their business volumes were lower during the summer of 1995 than they had been the previous summer, but most noted that the tourist industry in Washington had a generally slow summer and that it would be impossible to determine whether the security action had any effect on business volumes. Only one operator claimed that the action had directly caused a loss of business.

2.2.2.4 Analysis of Impacts on Public Transportation

The FHWA transportation analysis cites several effects upon the public transportation system caused by the security action. One was the need to move Metrobus routes to different streets because of both the security action and the traffic management responses. Another was the need to change bus stop locations because of route relocations and changes in street direction. A third was the changes in terminal locations and operations. Finally, there was the effect of changed traffic patterns and congestion levels upon running times and bus turning movements. The security action had no direct effect upon the Red, Orange and Blue lines of the Metrorail system, as they are entirely underground in the extended study area. Information in the FHWA report describing public transportation characteristics was obtained from the WMATA and through field observations.

Major modifications were made in bus route locations at two times, first at the time of the security action and immediate traffic management response, when buses routes were removed from Pennsylvania Avenue, and again when the June traffic management response was implemented. The second major modification, necessitated by the June traffic management response's new one-way street pattern, changed 25 routes, including both those that had been shifted to H Street because of the security action and other routes that had originally used H and I Streets. WMATA information indicates that these routes accounted for 1,240 bus trips on each weekday, 816 on Saturday, and 607 on Sunday. Other smaller changes were made later so that buses could avoid a congested location and take advantage of changes in street improvements.

The routes that had followed Pennsylvania Avenue past the White House were the most dramatically changed. These routes are 30, 32, 34, 35, and 36, which operate between Friendship Heights in Northwest Washington and Hillcrest, Naylor Gardens, and Shipley Terrace in Southeast Washington. These routes are part of the core bus system with frequent service. Together, they have an average five-minute

frequency during the weekday morning peak hour; even on Saturdays, they operate at a ten-minute frequency during the day. The routes were shifted to use the one-way pair of H and I Streets.

Another route that used Pennsylvania Avenue was Route 81, a variation on Route 80. Route 80 is also a core bus route that has high service levels; Route 81 was initially moved to H and I Streets and was subsequently consolidated into the basic route that operates in both directions on K Street.

Routes P17, P19, and W13 provide commuter service from the western part of southern Prince George's County. They operate only inbound in the morning and outbound in the evening, but have frequent service during the times that they operate. They operated westbound only on Pennsylvania Avenue; that movement was relocated to I Street.

Route X2 which used Madison Place and Pennsylvania Avenue between Madison Place and 15th Street also had to be rerouted.

Routes that originally used H or I Streets also had to be reconfigured because of the change in street direction in the June traffic management response. For example, Route 42, another route with high levels of service, previously followed H Street in both directions between 10th and 17th Streets. Route 42 continued to use H Street for the eastbound movement but the westbound movement was shifted to I Street. Routes S2, S3, S4, and S5, also part of the core bus system, previously operated westbound on H Street and eastbound on I Street between 11th and 16th Streets. With the change in direction of the streets, the operation of these routes was reversed to be westbound on I Street and eastbound on H Street.

A portion of the affected routes end in the extended study area, with a small loop at the end of the route so that the buses can turn around for the return trip. Some of those loops ran for only a block or two on H Street or I Street. These loops were modified to reflect the changes in street direction, with little effect upon the overall operation of the routes.

Some of the relocated routes are longer than the routes had been before the security action, some are shorter, and a few are the same length. The net effect of the route changes is an overall increase in bus miles operated, in part because the routes that were lengthened are ones with high service levels. WMATA calculated the net increase resulting from the changes in street operations on H and I Streets to be 16,800 bus miles per year. The rerouting to avoid 14th and H Streets added another 2,300 bus miles per year. WMATA calculated the increased Metrobus operating cost to the District of Columbia to be approximately $314,000 per year.

The changes in street operation required the relocation of some bus stops. The biggest changes were on I Street, where the June traffic management response included the reversal of the direction of traffic operation. Bus operations were switched to the opposite side of the street, requiring new stops to be created where none had been. WMATA was able to identify locations for new stops and to establish them without difficulty. The new stop locations are similar in character and accessibility to the previous locations. DCDPW estimated the one-time costs to the District of Columbia of relocating passenger-waiting shelters at stops to be approximately $40,000.

The FHWA analysis noted that, according to WMATA, the routes that were affected by the security action carry about 11,000 riders on a typical day, so the changes in Metrobus services had the potential to affect a large number of bus riders. Moving routes could make them more or less convenient, closer to or farther from Metrorail stations and other places to and from which people want to travel. Increases in travel time because of changes in routes or increases in traffic congestion could reduce the convenience of transit use. Because of concerns over the effect of the bus-route changes, WMATA monitored the ridership on

affected routes after the changes. According to the FHWA transportation analysis, WMATA staff reported that there were changes in ridership, but the effect of the changes in street operations could not be separated from other factors that would also affect ridership volumes.

2.2.2.5 Analysis of Impacts on Parking

The FHWA transportation analysis noted that there are 49 fewer on-street parking meters after the security action and the traffic management responses than before. Taking into account the amount of time each day that the meters would have been in effect, there are 1,203 less space-hours per week because of the changes. An inventory of the meters is reproduced from the FHWA transportation analysis in Table 2-6.

The DCDPW, Bureau of Parking Services, reports that the average downtown parking meter generates revenues of approximately $40 per week, with meters in use from Monday through Saturday, excluding ten weekday federal holidays. The average annual revenue per downtown parking meter is approximately $2,000. Therefore, the loss of 49 parking spaces will reduce annual revenue to the District of Columbia by approximately $98,000.

Information about off-street parking impacts was gathered for the FHWA transportation analysis through telephone interviews with five of the twelve major parking operators that were identified as operators of off-street parking lots or garages in the vicinity of the White House. They indicated a range of perceived impacts from "considerable business losses" to "no change" to "some increase in business." Parking operators with facilities on H Street complained about the loss of two-way travel and the loss of business from the east.

None of the parking operators contacted was willing to share detailed financial records describing before and after conditions. Based on this response and the unavailability of transaction data, the gains or losses for off-street parking businesses cannot be quantified.

Table 2-6
Comparison of the Number of Parking Meters and Metered Space Hours Per Week (6 days) Before and After the Security action and the Traffic Management Responses

Street	Before		After		Difference	
Segment Between	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week
15th Street						
K Street & I Street [1/]	22	819	22	1,149	0	330
I Street & H Street	16	624	16	804	0	180
H Street & PA/NY Avenue	25	975	25	1,725	0	750
I Street						
11th Street & 12th Street	4	216	3	162	-1	-54
12th Street & 13th Street	20	990	20	990	0	0
13th Street & 14th Street	35	2,250	25	1,575	-10	-675
14th Street & 15th Street	23	897	23	897	0	0
15th Street & Vermont Avenue	15	585	11	429	-4	-156
Vermont Avenue & 16th Street	15	585	10	390	-5	-195
16th Street & Connecticut Avenue	23	897	21	819	-2	-78
Connecticut Avenue & 17th Street	8	312	0	0	-8	-312
17th Street & 18th Street	28	1,092	22	858	-6	-234
18th Street & 19th Street	25	1,365	23	897	-2	-468
19th Street & 20th Street	20	1,050	18	972	-2	-78
20th Street & 21st Street	30	1,785	25	1,440	-5	-345
Pennsylvania Avenue						
15th Street & Madison Place	3	135	6 [2/]	270	(+3)	135
H Street						
13th Street & 14th Street	4	156	4	156	0	—
14th Street & 15th Street	16	624	16	624	0	—
15th Street & 16th Street	0	—	0	—	—	—
16th Street & Connecticut Avenue	0	—	0	—	—	—
Connecticut Avenue & 17th Street	0	—	0	—	—	—
17th Street & 18th Street	13	507	8	312	-5	-195
18th Street & 19th Street	14	546	12	738	-2	192
Total	**359**	**16,410**	**310**	**15,207**	**-49**	**-1,203**

[1/] Includes ten motorcycle parking spaces

Street	Before		After		Difference	
Segment Between	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week	# of Spaces	Space Hours Per Week

[2/] **Parking was later reconfigured in this area to add two more spaces, for a total of eight.**

2.3 AIR QUALITY

2.3.1 Affected Environment

A study of the potential air quality effects of the security action was conducted as part of this environmental assessment. This section addresses the security action, describes the current regulations, and presents the framework for the analysis.

2.3.1.1 National Ambient Air Quality Standards

The Clean Air Act of 1970 (CAA70) provided the mandate for the U.S. Environmental Protection Agency (EPA) to protect the public health by regulating air pollution. The EPA has established the National Ambient Air Quality Standards (NAAQS) for several major air pollutants, referred to as "criteria pollutants." The NAAQS for these criteria pollutants are shown in Table 2-7.

The NAAQS for several of the criteria pollutants were developed for multiple exposure times, based on the observed health responses to varying pollutant dosage and exposure. The observations clearly showed that, given longer exposure times, adverse health effects occur at substantially lower doses; e.g., both one- and eight-hour average standards were developed for carbon monoxide (CO) exposure. Each of the pollutants regulated by the NAAQS are described below.

2.3.1.2 Pollutants of Concern

Oxides of Sulfur (such as sulfur dioxide) are respiratory irritants associated with acid-gas and acid-rain formation. These pollutants are most frequently emitted as a result of the combustion of sulfur-containing fuels (such as heating oil) and are, therefore, not associated with mobile sources of pollution (such as motor vehicles).

Lead emissions have been, and continue to be, substantially reduced as a result of the reduction of the amount of lead contained in gasoline. Microscale lead analyses for highway projects are not warranted.

Inhalable Particulate Matter is matter that is smaller than 10 microns in diameter and is referred to as PM_{10}. This pollutant, a respiratory irritant, is primarily generated by stationary sources but is also produced by the combustion of diesel fuel, which is used by most buses and by some heavy trucks. Often, PM_{10} levels are associated with vehicular travel over unpaved areas, which drags and subsequently re-entrains dust into the air. PM_{10} is not currently a concern in Washington D.C. nor are elevated PM_{10} levels associated with an essentially gasoline-fueled vehicle fleet such as is operated in this metropolitan area.

Gasoline-powered vehicles emit both Volatile Organic Compounds *(VOCs)* and Oxides of Nitrogen *(NO_x)*. Oxides of nitrogen, such as NO_2, are reactive oxidants that, besides helping to form Ozone, are also associated with the formation of acid rain. Photochemical oxidants, such as hydrocarbons and other organic compounds, are reactive pollutants that act as the precursors to the formation of ozone in the presence of sunlight. This reaction occurs fairly slowly, and typically downwind of the emissions source. Thus, the effects of these pollutants are typically a regional concern and are analyzed on a regional basis (i.e., as part of a mesoscale study).

Ozone is an irritative reactive gas that has adverse health effects on human, animal, and plant life. Although transportation sources do not emit ozone, they do emit its precursors (i.e., NO_x and VOCs). The cumulative effects of transportation projects on these pollutants are a function of changes in regional vehicle miles traveled (VMT) and are analyzed as part of the State Implementation Plan (SIP) / Transportation Improvement Plan (TIP) conformity.

Carbon Monoxide is a colorless, odorless, and toxic gas that results primarily from the incomplete combustion of fossil fuels such as gasoline. High concentrations of CO are frequently associated with roadways that experience high vehicular volumes, low travel speeds, and traffic congestion. Carbon monoxide disperses rapidly with distance from the emissions source. Thus, local ambient CO concentrations are an issue of concern for projects that affect local roadway volumes and congestion.

Ozone and its precursors (NO_x and VOCs) are typically associated with transportation projects that can have material effects on regional travel. Since, on a regional level, the restriction of vehicular traffic on a few streets does not affect regional travel patterns or VMT, these pollutants are not of concern for this security action. However, the action does affect local traffic patterns, making local ambient CO concentrations a potential concern.

Table 2-7
National Ambient Air Quality Standards

	Primary		Secondary	
Pollutant	**ppm**	**$\mu g/m^3$**	**ppm**	**$\mu g/m^3$**
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean	0.03	80		
Maximum 24-hour Concentration*	0.14	365		
Maximum 3-hour Concentration*			0.50	1,300
Lead (Pb)				
Maximum Arithmetic Mean Averaged over 3 Consecutive Months	1.5			
Inhalable Particulate Matter (PM_{10})				
Annual Geometric Mean		50		50
Maximum 24-hour Concentration*		150		150
Nitrogen Dioxide (NO_2)				
Annual Arithmetic Average	0.05	100	0.05	100
Ozone (O_3)				
1-hour Maximum	0.12	235	0.12	235

Carbon Monoxide (CO)				
Maximum 8-hour Concentration*	9	10**	9	10**
Maximum 1-hour Concentration*	35	40**	35	40**

*These values are not to be exceeded more than once per year.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
**mg/m^3 = milligrams per cubic meter
Sources: 40 CFR Part 50 -- National Primary and Secondary Ambient Air Quality Standards
40 CFR 50.12 -- National Primary and Secondary Standards for Lead

2.3.1.3 Attainment Status of the Extended Study Area

Title I of the Clean Air Act Amendments of 1990 (CAAA90) requires that each region of the country be designated as either being in "attainment" or being in "non-attainment" of the standards for each criteria pollutant. For non-attainment areas, the severity of non-attainment is also designated and is determined by the degree to which air quality measurements exceed the NAAQS; this determination also defines the available time frame and the level-of-effort required for bringing the area into attainment.

Washington, D.C. has been designated as follows for the indicated criteria pollutants:

- a serious non-attainment area for ozone,
- an attainment area for CO, and
- an attainment area for PM_{10}.

The attainment requirements of the CAAA90 require stricter traffic and emission control measures to bring non-attainment areas into attainment. For Washington, D.C., such control measures are the vehicle inspection maintenance (I/M) program and the anti-tampering program (ATP) to reduce average fleet emission rates. The District is currently preparing to implement an enhanced I/M program in July of 1997. In addition to these programs, average fleet emissions tend to decrease as time progresses, since older automobiles that typically produce more pollution are retired and replaced with newer vehicles that have better emission-control systems.

The District's Implementation Plan, following the requirements of the CAAA90, has set forth a schedule to bring the criteria pollutant ozone into compliance. The attainment goal for the Washington, D.C. area for ozone is 1999. In 1995, the District was redesignated as being in attainment for CO.

2.3.1.4 Conformance of the Security Action with Regulatory Requirements

Under the NEPA EA process, the potential for all environmental impacts, including those that pertain to air quality, must be assessed and disclosed. The air quality assessment performed for the security action fulfills this NEPA requirement.

All new or ongoing federal or federally-regulated projects must be assessed with respect to the conformity regulations of the Clean Air Act of 1970 (CAA70) and its 1990 amendments (CAAA90). Since the security action was not undertaken by the FHWA or FTA (40 CFR Part 51.394(2)), and was not adopted,

supervised, or approved under title 23 U.S.C. or the Federal Transit Act (40 CFR Part 51.450), the security action is not subject to the Transportation Conformity Section of the CAAA90. Actions by non-transportation agencies are assessed with respect to the General Conformity Section of the CAAA90.[1]

A federal action is defined as *regionally significant* under General Conformity if for the purpose of determining the applicability of General Conformity and the need for a *conformity determination*, its *direct or indirect emissions* exceed *de minimis* values specified in the General Conformity regulations for each criteria pollutant (see Table 2-8). *Regionally significant* actions must either be found to conform with the applicable State or Federal Implementation Plan (SIP) or undergo a *conformity determination* to insure that their associated emissions are accounted for appropriately and sufficiently offset by the region.

Table 2-8
***De Minimis* Criteria For General Conformity**

Pollutant	*De Minimis* Tons/Yr
Ozone(VOCs or NO_x)	50
CO	100
SO_2 and NO_2	100
PM_{10}	100
Pb	25

Source: 23 CFR 51.853

For the purpose of determining the need for a *conformity determination*, *direct emissions* are defined as those which directly result from the action. *Indirect emissions* are defined as emissions that may occur farther away or later in time from the action, but are both reasonably foreseeable, and for which the acting agency maintains responsibility through ongoing program control. *Direct emissions* from the action (which were limited to those that arose from placing restrictive barriers) are negligible.

[1] The implementing guidance for the General Conformity regulations of the CAAA90 are given in Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, 40 CFR Parts 6, 51 and 93, published Tuesday, November 30, 1993 in the Federal Register, Vol. 58 No. 228, pages 63213-63259.

The other effects on emissions are associated with traffic changes. The Department of the Treasury does not maintain responsibility for traffic effects through ongoing program control. Thus, for the purpose of assessing the status of the security action with respect to General Conformity, the traffic emissions which result from traffic changes are not added as *indirect emissions* associated with the action. Since the total direct and indirect emissions of the action are below the *de minimis* threshold, the security action is not considered to be *regionally significant* and does not require a conformity determination under the General Conformity Section of the CAAA90. However, the NEPA analysis followed the same modeling procedures that would have been used for a conformity determination.

The security action has had minimal effect on regional emissions, and therefore, is not expected to interfere with the District's maintenance or attainment of standards. The security action could potentially have affected ambient pollutant concentrations. Since CO is the only pollutant of potential concern for the security action, the air quality study addresses the security action's effects on ambient CO concentrations.

2.3.2 Impacts Analysis

Shortly after the initial vehicular restrictions, H Street and I Street were made one-way only and some signal operations changes were implemented to facilitate traffic flow. The air quality analysis modeled maximum potential CO concentrations, using conservative modeling assumptions, with traffic analysis performed for the security action. Traffic data for the analysis include those changes in traffic operations associated with the security action.

In addition to the assessment of existing conditions, the effect of traffic from the Ronald Reagan Building, currently under construction, was assessed. These results are described in the section on cumulative impacts of the security action.

Conditions before the action cannot be modeled because specific input data for the modeling process were not collected prior to implementation of the security action. Therefore, the "No Build" scenario conditions have not been assessed.

2.3.2.1 Analysis Methodology

For each selected analysis location, scenario, and for both the AM and PM peak periods, the maximum potential one-hour and eight-hour average concentrations were projected. Vehicular emissions were estimated using the EPA MOBILE 5a[2] emissions model for January (winter) of 1997. Pollutant dispersion was calculated using the CAL3QHC[3] (Version 2) screening model.

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[2] User's Guide to MOBILE 5 Mobile Source Emission Factor Model Report #EPA-AA-AQAB-94-01 E.P.A. Office of Air & Radiation & Office of Mobile Sources, Ann Arbor, Michigan, May 1994

[3] User's Guide to CAL3QHC Version 2, A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections, Office of Air Quality, Planning Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina

Mathematical modeling of complex physical phenomena, such as air flow and pollutant dispersion, can only be accomplished through the use of simplifications. These simplifications are formulated so as to be conservative under the worst-case conditions. Therefore, the models conservatively over-predict CO concentrations, especially under the worst-case meteorological conditions. Consequently, CAL3QHC was run with EPA-recommended conservative screening assumptions.

To determine total ambient concentrations at a given location, the locally induced pollutant concentrations, calculated with CAL3QHC, were added to the background concentration. The 1-hour average CO concentrations were calculated by summing the CAL3QHC results with the 1-hour average background value. The 8-hour average results were calculated by applying an EPA-recommended "persistence factor" of 0.70 to the CAL3QHC result, and then adding the 8-hour average background value. The "persistence factor" represents the decrease in the average 8-hour concentration relative to the peak 1-hour concentration. This decrease is caused by fluctuations in the wind's direction and speed, decreases in traffic volumes from the peak hour, and other time-dependent factors.

2.3.2.2 Model Inputs

Vehicle-mix data, basic I/M program and ATP parameters, registration distribution, and trip length data that were input to MOBILE5a were obtained from the Metropolitan Washington Council of Governments (MWCOG). The District projects a transition to an enhanced I/M program (I/M 240) as early as June of 1997. Therefore, a basic I/M Program was assumed for the 1997 calculations, and an enhanced program assumed for the 1997 cumulative impact calculations.

Speed data were obtained from observed average corridor speeds. Because the dispersion model (CAL3QHC version 2) requires running (green-phase) speeds, the data were collected to obtain both average speed and stopped delay as a fraction of total travel time.

Background concentrations for 1997 were based on data[4] that provide background concentrations for 1993 and 1998 model years. These values were obtained via "rollback" from earlier data, whereby the decreasing fleet-average emission factors for the years of concern are applied to a known set of background concentrations to obtain future concentrations. The background concentrations used in the 1997 analysis of the security action are 2.48 parts per million (ppm) for the 1-hour average and 1.49 ppm for the 8-hour average. The background value used in the 1999 analysis of cumulative impacts with the Ronald Reagan Building are 2.12 for the 1-hr average and 1.27 for the 8-hr average.

2.3.2.3 Selection of Analysis Locations

Analysis locations were selected to include the worst-case locations affected by the security action. High CO concentrations are frequently associated with roadways that experience high vehicular volumes, low travel speeds, and traffic congestion and queuing. The following locations were selected as worst-case sites for CO analysis:

- K Street at Connecticut Avenue / 17th Street
- I Street at Connecticut Avenue / 17th Street
- Pennsylvania Avenue at 17th Street

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[4] The Barney Circle Freeway Modification Project Environmental Assessment, D.C. Dept. of Public Works and FHWA, August 1995

- 14th Street at H Street / New York Avenue
- Constitution Avenue at 14th Street and at 15th Street

The H Street and I Street locations were selected because their travel directions were modified in the June traffic management response. They now carry different traffic volumes than they did before the security action. The locations at Pennsylvania Avenue at 17th Street and Constitution Avenue at 14th and 15th Streets were chosen because they carry higher volumes of east/west traffic diverted by the security action. The selected locations are shown in Figure 2-6.

2.3.2.4 Results

The highest results for each analyzed location are shown for 1997 conditions in Table 2-9. The NAAQS would not be exceeded at any analyzed location in either peak travel period. Maximum projected CO levels at the heavily traveled Constitution Avenue intersection and the congested 14th and H Streets / New York Avenue intersections are predicted to approach but not exceed the NAAQS 8-hour CO standard.

The highest projected CO concentrations are below the NAAQS and the security action would not affect regional emissions. Therefore, there would be no air quality impacts associated with the security action: the security action conforms to the Washington, D.C. Implementation Plan.

The highest results for 1999 conditions which include the effects of both the traffic generated by the Ronald Reagan Building and the integrated traffic management system (ITMS) are shown for each 14th Street location in the cumulative impacts section. None of these results exceed the NAAQS at either location for either peak travel period. The PM period results for 14th and H Streets / New York Avenue are much lower than for 1997 conditions due to the beneficial effects of the ITMS project.

Table 2-9
Maximum Ambient Carbon Monoxide Concentrations (ppm)
1997 Analysis of Effects of the Action - AM and PM Peak Periods

	Analysis Location	1-hour (NAAQS = 35.0 ppm)		8-hour (NAAQS = 9.0 ppm)	
		AM	PM	AM	PM
1	K St. @ 17th St. - West	8.1	12.1	5.4	8.2
	K St. @ 17th St. - East	7.8	8.4	5.2	5.6
2	I St. @ 17th St. - West	8.8	12.1	5.9	8.2
	I St. @ 17th St. - East	8.1	10.7	5.4	7.2
3	Pa. Ave. @ 17th St.	9.7	11.0	6.5	7.4
4	14th St. @ H St. & New York Ave.	8.3	12.8	5.6	8.7
5	Const. Ave. @ 14th St.	10.9	12.4	7.4	8.4
	Const. Ave. @ 15th St.	11.4	11.5	7.7	7.8

NOTES:
1. 1-hour Background Concentration = 2.48 ppm
2. 8-hour Background Concentration = 1.49 ppm

Figure 2-6: Air Quality Analysis Locations

2.4 NOISE

2.4.1 Affected Environment

The extended study area is located in a central urban setting that includes arterial roadways and side streets, commercial, office and recreational land uses, and is close to the flight paths of aircraft approaching and departing National Airport. (See Figure 2-2 for generalized land use in the extended study area.) Although the existing roadway system is and will continue to be a major source of noise in the area, other noise sources such as aircraft, pedestrian activities, and building ventilation and air conditioning equipment are also evident.

Changes in traffic volumes and speeds or in the mix of vehicles (cars, trucks, and buses) can alter the levels of noise along existing roadways and streets. As a result of changes in traffic characteristics on numerous streets in the extended study area occurring after the security action, an analysis of noise and its potential impact on sensitive receptors was conducted.

Noise Metrics. Noise levels in the area of the security action are typical of an urban location consisting of land uses as noted above, and are, for the purposes of analyzing traffic noise impacts, presented in terms of the A-weighted equivalent sound level, abbreviated as L_{eq}. This sound level is a single-number representation of the actual fluctuating sound level that accounts for all the sound energy during a given period of time. The units of L_{eq} are A-weighted decibels, or dBA. The A-weighting means that the sound level is measured in a method that approximates the response of the human ear with de-emphasis of low and very high frequencies and emphasis on the mid-frequency range. Generally, the minimum change in noise levels that the human ear can perceive is 3 dBA.

The Federal Highway Administration (FHWA) has established Noise Abatement Criteria (NAC), as illustrated in Table 2-10, for road and highway projects based on various land uses. These criteria are used to determine when abatement or mitigation of noise levels should be considered in a highway project. Land uses in the extended study area are predominantly Category B, which includes hotels, churches and parkland and has an NAC criterion of 67 dBA, and Category C, which consists of commercial and office uses and has an NAC criterion of 72 dBA.

Table 2-10
FHWA Noise Abatement Criteria

Land Use Category	L_{eq}	Description of Land Use
A	57 dBA	Tracts of land in which serenity and quiet are of extra-ordinary significance, which serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 dBA	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, playgrounds, active sports areas, and parks
C	72 dBA	Developed lands, properties, or activities not included in Categories A and B
D	---	Undeveloped lands
E	52 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Noise Levels Prior to the May 20, 1995 Security Action. Due to the emergency nature of the security action, no systematic noise measurements were taken in the extended study area prior to the action. However, previous studies completed on other projects in central Washington give an indication of what the range of noise levels would have been prior to May 20, 1995. Four environmental impact studies for highway and urban development projects were examined to determine what levels of noise may have existed in the extended study area. These studies included measurements of actual noise levels at 14 sites adjacent to streets and roads, including portions of Pennsylvania Avenue east and west of the White House, that would be considered relevant or similar to the types of locations affected by changes in vehicular traffic in the vicinity of the White House. Table 2-11 presents a summary of these measurements and indicates that noise levels adjacent to streets and roadways in central Washington ordinarily have ranged from 64 dBA to 78 dBA. Review of additional urban traffic noise studies conducted in New Haven, New York City, Norfolk, and Miami confirm that this range of ambient noise levels is typical of central city locations.

Noise levels in heavily urbanized areas can vary considerably over short periods of time because of the intermittent or erratic occurrence of other extraneous noise incidents such as aircraft passing nearby, construction vehicles and equipment operating in the area, and the passing of emergency vehicles using their sirens. Additionally, in urban locations such as downtown Washington, D.C., sensitive noise sites can be in close proximity to roadways (e.g., as close as 10 to 25 feet) or further away such as the central portions of parks that are hundreds of feet from sources of traffic-generated noise. Vehicles passing close to a receptor, even when traffic levels are not high, can create high levels of noise. However, noise levels decay rapidly with distance away from a roadway, with a 3 dBA decrease for every doubling of distance from the noise source. Thus, a noise level of 67 dBA 10 feet from a roadway edge would be 64 dBA 20 feet away, and 61 dBA at a distance of 40 feet from the roadway.

Table 2-11
Ambient Noise Levels in Central Washington, D.C.
As Measured in Previously Conducted Studies

Study Date	Study	Number of Sites Measured[a]	Range of Noise (in $dBA_{(Leq)}$)
1982	Federal Triangle Environmental Impact Statement[b]	3	69 to 78
1982	Environmental Assessment of Eastern Sector of Pennsylvania Avenue Development Area[c]	7	65 to 76
1985	Whitehurst Freeway Environmental Impact Statement[d]	2	64 to 66
1995	Barney Circle Freeway Modification Environmental Assessment[e]	2	68 to 70

(a) Noise monitoring locations similar to those in White House Extended study area.
(b) Federal Triangle Master Plan Environmental Impact Statement, GSA, 1982.
(c) Environmental Assessment Eastern Sector Proposed Changes, Pennsylvania Avenue Development Corporation, 1982, Appendix B, p. B-12.
(d) Whitehurst Freeway Corridor System Modification Study, Final Environmental Impact and 4(f) Evaluation, D.C. Department of Public Works, 1985, p. 3-45.
(e) Barney Circle Freeway Modification Project, Environmental Assessment, D.C. Department of Public Works, 1995, p. 2-114.

2.4.2 Impacts Analysis Methodology

Because of the emergency nature of the security action, no noise measurements were conducted prior to the action. To establish comparative background noise data, four previous studies conducted in similar central Washington, D.C. locations were examined, and the results provided in Section 2.4.1 and in Table 2-11. Review of additional studies of urban traffic noise from other cities was undertaken to confirm the range of noise levels shown in Table 2-11.

To conduct actual monitoring of post-action noise levels, fourteen representative sensitive noise receptor sites were selected in the extended study area. Noise was monitored at each of these sites. The noise levels recorded were compared to the noise data provided by the four previous studies and the reviews of noise levels in other cities to confirm the general range of noise levels.

An FHWA traffic noise prediction model, described in Section 2.4.3, was then used to predict post-action noise levels at the same 14 receptor sites used for the monitoring. The post-action model results were compared against the actual measured noise levels at the sites to verify the capability of the model to accurately predict actual noise levels. The pre-action noise level data was then modeled and compared to the modeled post-action noise levels.

2.4.3 Impacts Analysis

To establish the effects of noise resulting from the security action, selected exterior sensitive receptors in the extended study area were examined. The selected receptors are primarily locations that are accessible to the public and that are also representative of other similar receptors in the extended study area. The selected receptors include parkland, the front grounds of a church, a monument, and street corner locations at two museums. In addition, an exterior location on the east side of the White House north portico facing Pennsylvania Avenue was also examined. This location is accessed by members of the public following visits to the White House and just before exiting to Pennsylvania Avenue, and is considered to be particularly sensitive to noise intrusion. In all, 14 sites were identified as being both sensitive receptors and locations that are representative of receptors in the extended study area. The 14 sites are shown on Figure 2-7.

Noise was monitored at each receptor site using a RTA Technology Environmental Noise Logger meter for a 15-minute period. Noise levels were recorded in $dBA_{(Leq)}$ and are shown in Table 2-12.

Noise levels recorded at the 14 sites ranged from 56 dBA to 74 dBA. The average reading for all sites is 66 dBA and both the individual and average noise levels are consistent with the measurements taken at other nearby locations in the studies noted in Table 2-11, above.

Figure 2-7 - Noise Monitoring Locations

Table 2-12
Monitored Noise Levels[1]

Site No.	Location	Description	Noise Level (in $dBA_{(Leq)}$)
1	1600 Pennsylvania Avenue	White House, east side of north portico	58
2	1600 Pennsylvania Avenue	Street location in front of White House	64
3	Lafayette Square	Park, at center	61
4	St. John's Church, 1525 H Street	Church, front grounds facing on 16th Street	69
5	748 Jackson Place	Museum, Decatur House, corner of H Street and Jackson Place	71
6	17th Street and Pennsylvania Avenue	Museum, Renwick Gallery	68
7	Edward R. Murrow Park	Park, at intersection of H Street and Pennsylvania Avenue	67
8	Rawlins Park	Park, E Street, facing Department of Interior	63
9	17th and Constitution Avenue	Park	73
10	State Place	Monument, First Division Memorial Monument	56
11	E Street	White House, public viewing area, south of White House grounds	65
12	Pershing Park	Park, 14th Street and Pennsylvania Avenue	72
13	McPherson Square	Park, I Street and 15th Street	74
14	Farragut Square	Park, Connecticut Avenue and I Street	69

1 Monitoring conducted during daytime hours, August 29, 1996.

In order to identify possible impacts of the security action on traffic noise levels it is necessary to estimate what noise levels were in the vicinity of sensitive locations in the extended study area prior to May 20, 1995, and then compare those to noise levels following the security action. To do so, a noise prediction model, as noted below, was utilized to estimate both past noise levels and current noise levels generated by traffic. Post-action traffic data gathered for the preparation of the FHWA report, *Analysis of Transportation Conditions After Traffic Restriction and Street Modifications in the Vicinity of the White House*, was utilized for determining post-action noise levels. Pre-action traffic data that was collected by the NPS in the summer of 1992 and spring of 1993 was used to determine pre-action noise levels. The existing noise levels, as presented in Table 2-13, were used to validate the noise prediction model.

The FHWA Highway Traffic Noise Prediction Model - Manual Method [5] was used to estimate noise levels

at the selected receptor locations. This model consists of a nomograph and set of equations utilizing as input vehicle types, traffic volumes, vehicle speeds, and distances to receptors. The model presents an estimate of traffic noise levels in $dBA_{(Leq)}$ and is particularly useful when examining relatively small sites such as those associated with receptors in the extended study area.

Table 2-13
Model Validation Using Predicted and Monitored Noise Levels in $dBA_{(Leq)}$

Site No.	Location	Predicted Noise Level	Measured Noise Level	Difference
1	1600 Pennsylvania Avenue	N/A	58	N/A
2	1600 Pennsylvania Avenue	N/A	64	N/A
3	Lafayette Square	N/A	61	N/A
4	St. John's Church, 1525 H Street	70	69	-1
5	748 Jackson Place	71	71	0
6	17th Street and Pennsylvania Avenue	72	68	-4
7	Edward R. Murrow Park	71	67	-4
8	Rawlins Park	67	63	-4
9	17th and Constitution Avenue	73	73	0
10	State Place	58	56	-2
11	E Street	68	65	-3
12	Pershing Park	74	72	-2
13	McPherson Square	71	74	+3
14	Farragut Square	72	69	-3

Using post-action traffic data from roadway segments adjacent to the 14 monitored sites, noise levels were estimated at these locations and compared to the actual monitored noise levels. Table 2-13 presents the results of the modeling in comparison to the actual measured noise levels.

The comparative analysis indicates that the FHWA model can closely predict actual noise levels based on the traffic and geometric data available. The differences, which range from 0 to 4 dBA, are acceptable for this level of analysis and represent noise levels that would, at a maximum, be barely perceptible to the human ear. In most cases where actual noise levels are below the modeled levels (Sites 4, 6, 7, 8, 10, 11, 12 and 14), the model does not account for the shielding effects of neighboring structures and thus predicts a slightly higher value. In the case of Site 13 (McPherson Square) notable lunch-time crowd noises resulted in a higher actual reading compared to the predicted traffic-generated noise levels. At Sites 1, 2, and 3 at the White House a direct comparison of monitored and modeled traffic noise levels is not possible due to the removal of traffic from Pennsylvania Avenue at that location.

In order to determine the effects of the security action on traffic noise levels in the post-action period, the FHWA model was used to estimate the pre-action noise levels that were then compared to the post-action levels. Traffic data from the FHWA transportation analysis for locations adjacent to the 14 tested sites was used as input to the model. The results of this comparative analysis are presented in Table 2-14.

The analysis shows that noise levels decreased at most examined sensitive receptor sites. Noise levels decrease by 4 to 5 dBA at receptors along H Street (Sites 4 and 5) and at State Place (Site 10) and E Street (Site 11). Also, in comparing the results of actual noise measurements at receptors at the White House and Lafayette Square, as presented in Table 2-12, with the results of the estimated pre-action noise levels presented in Table 2-14, it is clear that noise levels at these particularly sensitive receptors have also dropped. At Site 1, the White House north portico, noise levels are estimated to have decreased 2 dBA. This decrease is minor, due to the distance of the site from Pennsylvania Avenue and the shielding and soft absorptive ground attenuation effects attributable to the site. At Site 2, the sidewalk location in front of the White House on Pennsylvania Avenue, a substantial decrease of 8 dBA is estimated to have occurred. This is a result of the removal of vehicular traffic from Pennsylvania Avenue at that location. In Lafayette Square (Site 3) noise levels are estimated to have decreased 3 dBA due to the removal of traffic from Pennsylvania Avenue and Madison Place.

The analysis also indicates that traffic noise levels at two locations on I Street (Site 13 at McPherson Square and Site 14 at Farragut Square) increase slightly, by 1 to 2 dBA, as a result of the shift in traffic to this roadway. These increases should not be perceptible. Although post-action traffic levels increased on Constitution Avenue (Site 9), the resulting increase in noise was offset by a decrease in noise from lower traffic levels on intersecting 17th Street. At other locations along Constitution Avenue, further from the 17th Street intersection, noise levels will have increased by less than 1 dBA, an imperceptible amount.

Table 2-14
Estimated Pre-action and Post-action Noise Levels in $dBA_{(Leq)}$

Site No.	Location	Pre-Action Noise Level	Post-Action Noise Level	Difference
1	1600 Pennsylvania Avenue	60	N/A	N/A
2	1600 Pennsylvania Avenue	72	N/A	N/A
3	Lafayette Square	64	N/A	N/A
4	St. John's Church, 1525 H Street	75	70	-5
5	748 Jackson Place	75	71	-4
6	17th Street and Pennsylvania Avenue	75	72	-3
7	Edward R. Murrow Park	73	71	-2
8	Rawlins Park	68	67	-1
9	17th and Constitution Avenue	73	73	0
10	State Place	64	58	-6
11	E Street	72	68	-4

12	Pershing Park	75	74	-1
13	McPherson Park	70	71	+1
14	Farragut Square	70	72	+2

In conclusion, it is estimated that traffic noise levels have decreased in the core study area, a NAC Category B area centered on the White House and the neighboring historic buildings and parkland, as a result of the removal and diversion of traffic from this area. As a consequence of the diversion, however, noise was shifted to the I Street corridor as evidenced by the estimated slight increases in noise at McPherson and Farragut Squares. This corridor, a retail and office NAC Category C area, is less sensitive to noise impacts.

While most noise levels in the area will continue to exceed the appropriate NAC as they did prior to the action, except in the core area near the White House, there are little or no practicable mitigation measures that can be employed. Noise barriers or other structural measures are not feasible due to the substantially negative impacts they would have on access and sightlines. Operational measures (e.g. the prohibition of truck traffic) are not feasible either, due to the need to maintain traffic flow and vehicular access to this central core area of the city. Given that the estimated increases in noise in the I Street corridor are relatively minor (i.e., less than a perceptible amount), no mitigation is recommended.

2.5 VIBRATION

2.5.1 Affected Environment

The extended study area is in the core of an urban area with commercial, office, governmental, recreational, and tourism-related land uses. Historic structures and open space are two land use designations of concern for vibration issues in the extended study area.

Changes in levels of ground-borne vibration may result from modifications to the transportation network, which consists of both an on-street vehicular network and the Metrorail subway system. An assessment of vibration and its potential impact on surrounding land uses and structures was performed in response to the changes in traffic flow patterns and vehicle mixes, especially trucks and buses, in the extended study area. This section discusses ground-borne vibration impacts that may have resulted from the security action and subsequent traffic and Metrobus rerouting in the extended study area.

2.5.2 Concepts and Impact Criteria

Ground-borne vibration can be a concern for nearby neighbors of roadway and transit system routes. The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The vibration of floors and walls may cause perceptible vibration, rattling of items such as windows or dishes on shelves, or rumble noise. The rumble noise is the noise radiated from the motion of the room surfaces. This effect is called ground-borne noise.

Noise -

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, or is otherwise annoying (i.e., unwanted sound). Under certain conditions, noise may cause hearing loss, may interfere with human activities at home and work, and, in various ways, may affect people's health and well-being.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to account for the response of the human ear. Community noise levels usually change continuously during the day. The equivalent sound level (L_{eq}) is normally used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time-varying A-weighted sound level during the same time interval. The maximum sound level (L_{max}) is the highest instantaneous sound level observed during a single noise measurement interval, regardless of the length of time the sound may persist and whether the noise source is ambient or project related.

Vibration -

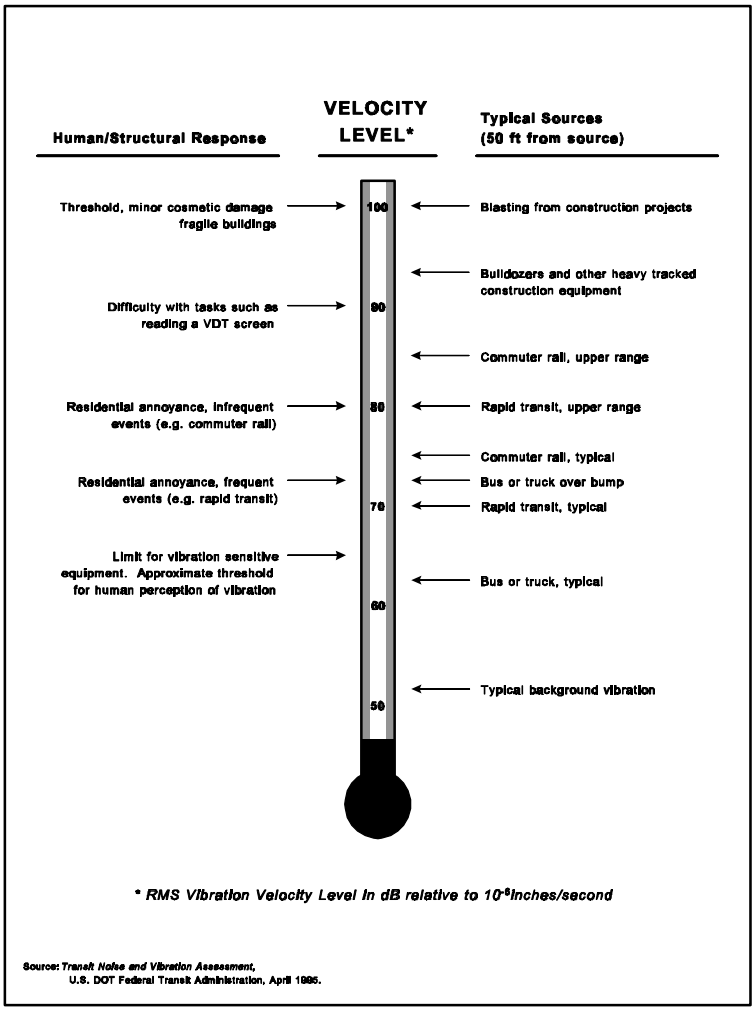
Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. For a vibrating structural component, such as a building floor, the displacement is the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is normally described using velocity or acceleration. In this study, velocity is used to describe ground-borne vibration.

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal. The RMS of a signal is the average of the squared amplitude of the signal. Although PPV is appropriate for evaluating the potential of building damage because it is based on consideration of instantaneous measures, it is not suitable for evaluating human response because it often takes some time for the human body to respond to vibration signals. RMS amplitude is used to evaluate both vibration impacts on buildings and human responses to vibration.

The RMS velocity is normally described in inches per second. Decibel notation acts to compress the range of numbers required to describe vibration. All vibration levels in this study are in decibels and are referenced to one microinch/sec. Figure 2.8 illustrates common vibration sources and the human and structural response to ground-borne vibration. As shown in Figure 2.8, the threshold of perception for humans is approximately 65 dB; however, human response to vibration is not usually significant unless the vibration exceeds 70 dB.

Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration levels, respectively, observed during a single vibration measurement interval. In addition, exceedance levels are also used where L_{90} exceedance level is the level that is exceeded for 90% of the measured interval; this is generally regarded as the background level. These descriptors assist in the identification of short- and long-duration vibration and provide for better interpretation of measurement results.

There are no Federal Highway Administration (FHWA) standards for vibration. The Federal Transit Administration (FTA) provides ground-borne vibration impact criteria for various types of building uses (USDOT, 1995). Two categories of vibration criteria apply to this security action: they are classified as “human annoyance” and “building damage.”



Human Annoyance Criteria -

Table 2-15 presents the criteria for various land use categories as well as the frequency of vibration events. These criteria are related to ground-borne vibration that causes human annoyance or that interferes with the use of vibration-sensitive equipment. The criteria for acceptable ground-borne vibration are expressed, in terms of RMS velocity levels, in dB and are based on the maximum levels for a single event (L_{max}). Human annoyance from vibration events often occurs when the vibration level exceeds the threshold of perception (65 dB) by 10 dB or more. This level is an order of magnitude below the damage threshold for buildings.

All four sensitive receptors on H Street fall under Category 3 with primarily daytime use. Buses and trucks are the major vibration sources within the area. The maximum vibration level of 75 dB will be used as project criteria since buses and trucks occurred more than 70 times per day (i.e., these were "Frequent Events").

Table 2-15
Ground-borne Vibration Criteria for Human Annoyance

Land Use Category	Ground-borne Vibration Impact Levels (dB referenced to 1 microinch/sec)	
	Frequent[1] Events	**Infrequent[2] Events**
Category 1: Buildings where low ambient vibration is essential for interior operations	65 dB[3]	65 dB[3]
Category 2: Residences and buildings where people normally sleep	72 dB	80 dB
Category 3: Institutional land uses with primarily daytime use	75 dB	83 dB

Source: USDOT, 1995
Notes: 1. "Frequent Events" are defined as more than 70 vibration events per day.
2. "Infrequent Events" are defined as fewer than 70 vibration events per day.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Building Damage Criteria -

There are no FHWA standard building damage criteria related to normal traffic operation. However, the FTA has established a vibration damage threshold criteria of 100 dB for the velocity level of fragile buildings and of 95 dB for the velocity level of extremely fragile historic buildings (USDOT, 1995) for typical construction equipment. The FTA recommends these criteria be used as a damage threshold for the fragile structures located near the right-of-way of a transit project.
The criteria are based on L_{max} for a single event, such as a bus pass by. In addition, the criteria refer to motion at the building ground level and do not consider any allowance for the amplifying or attenuating effects of building structural components, such as may occur in multi-level structures. Since some of the structures within the area (e.g., Decatur House) are considered extremely fragile under this criteria, the L_{max} of 95 dB at the ground level will be used as the building damage criterion.

2.5.3 Measurements

The information contained in this section of the EA is taken from the *H Street Vibration Study*, conducted for the Department of the Treasury by Parsons Engineering Science. The vibration study was performed to determine the potential impact of traffic vibration at historic structures on H Street within the vicinity of Lafayette Square and to present feasible mitigation measures to address potential traffic vibration impact. Due to the emergency nature of the security action, the data collected for this study reflects the conditions after the implementation of the security action. However, the collected data can also be used to estimate the pre-action conditions.

Short-term vibration and noise measurements were conducted from March 18 to March 20, 1997 at four sites along H Street. These sites were selected by the Department of Treasury and identified as sensitive receptors. They include: the Ashburton House at 1525 H Street, the Decatur House at 748 Jackson Place (corner of Jackson Place and H Street), the Dolley Madison House at 721 Madison Place (corner of

Madison Place and H Street), and the U.S. Chamber of Commerce Building at 1615 H Street. At each of the sites, measurements were conducted at three locations: outside the building on the sidewalk, inside on the first floor or basement, and inside on the upper floor. In addition, long-term vibration and noise measurements were also conducted at the Ashburton House to provide a typical vibration and noise pattern over a 24-hour period.

Noise and vibration measurements were conducted simultaneously at the outside locations and at each of the inside locations in order to correlate the measured data. For each set of the short-term measurements, data were collected for approximately 10 to 20 minutes to acquire an adequate number of representative bus and truck pass bys. The measurement equipment was set to collect continuous L_{max}, L_{eq}, and statistical level (L_n) measurements and to record at 1-minute intervals for the short- term measurements. For the long-term measurements, the equipment was set to record at 15-minute intervals.

2.5.4 Impacts Analysis

2.5.4.1 Measurement Results

The long-term vibration data are consistent with traffic flow in the area. Higher vibration levels occurred during daytime and evening hours, when the traffic volume is usually higher, while lower vibration occurred during the night (approximately between 2:00 a.m. and 5:00 a.m.) when traffic is usually lower in volume. The traffic volumes began to decrease at around midnight and began to increase again at approximately 5:00 am. Between the hours of 5:00 a.m. and 2:00 a.m. of the next morning, the L_{max} varied between 67 to 77 dB. It was observed and later correlated that L_{max} typically represented vibration generated by buses or trucks traveling over potholes.

The short-term vibration data indicate that the vibration generated by the traffic on H Street exceeded the L_{max} human annoyance criterion of 75 dB for frequent events (more than 70 events per day). This was especially true for the upper floor levels, where L_{max} vibration could be as high as 85 dB. Based on both the long-term and short-term measurements, the building damage criterion would not be exceeded at any location. Detailed data for each measurement site are provided in the *H Street Vibration Study* (Parsons Engineering Science, 1997).

Ashburton House -

Noise and vibration measurements were conducted between 10:45 a.m. and 11:35 a.m. on March 18, 1997 at the Ashburton House. There are two loose manhole covers on manholes that are incorrectly aligned with the road surface in front of the building. Loose manhole covers and poorly aligned manholes can increase vibration when vehicles travel across them.

Review of the measured data indicates that the levels of vibration generated by buses and heavy trucks on H Street is high enough to cause human annoyance inside the building. Data recorded on the first and third floors show that typical vibration levels generated by traffic on H Street are above the threshold of perception. However, vibration levels generated by people walking inside the room are typically higher than those levels generated by traffic on the street. Based upon field observation and the measured data, the rattling of windows at the building is caused by the high levels of low frequency noise generated by buses and heavy trucks as they pass by the structure.

Decatur House -

Measurements at the Decatur House were conducted between 12:30 p.m. and 1:30 p.m. on March 18, 1997. Most of the buses were traveling in the two traffic lanes nearest the building. During the measurement period, there were also tour buses idling on the south side of H Street east of Connecticut Avenue.

High background vibration levels exist in Decatur House, probably due to a building mechanical system. The background vibration levels for both the outside and inside locations are well below the threshold of perception. However, the maximum vibration inside on the third floor is well above the human annoyance criterion. Review of the measured data indicates that there is a strong amplification of vibration from outside to inside due to the building's structure. The maximum vibration levels are primarily due to buses and heavy trucks passing on H Street. Buses and heavy trucks typically generate vibration above L_{max} of 80 dB inside on the third floor. Based on the measured data, these sources generate vibration inside the first floor of the Decatur House of up to an L_{max} of 86 dB.

Noise generated by bus and truck exhaust can be heard inside the Decatur House on the third floor. These sources generate noise levels up to an L_{max} of 94 dBA at the sidewalk level.
A moisture and vibration study was prepared at the Decatur House for the National Trust for Historic Preservation in December of 1994 (NTHP, 1994). The study concluded that the major sources of vibration at the Decatur House were bus and heavy truck traffic through the intersection of H Street and Jackson Place. Because the study was completed in 1994, its data can be used in conjunction with the 1997 measurements to establish the baseline vibration condition.

Dolley Madison House -

Measurements at the Dolley Madison House were conducted between 3:45 p.m. and 4:30 p.m. on March 19, 1997. During the measurement period, most of the buses were traveling in the second traffic lane from the south sidewalk.

The background (L_{90}) vibration levels measured both outside the building on the sidewalk and inside the building in the basement are well below the threshold of perception. The maximum vibration levels for these locations were 75 and 71 dB, respectively. There is no vibration amplification between the sidewalk and the basement. In addition, the maximum vibration levels inside the building in the basement are below the human annoyance criterion. The vibration measured on the third floor is higher than that measured in the basement, due to the amplification by the building's structure. During the measurement period, there were vibration events with the maximum level above L_{max} of 75 dB, the level at which human annoyance can occur.

The noise measured inside the building in the basement was mainly due to the building mechanical system, with occasional loud noise from buses and trucks traveling on H Street.

Chamber of Commerce -

Noise and vibration measurements were conducted between 10:05 a.m. and 11:05 a.m. on March 20, 1997 at the Chamber of Commerce. There are two loose manhole covers, one in the nearest lane and one in the second lane, in front of the Chamber of Commerce building. Loose manhole covers can increase vibration when vehicles travel across them. Most of the buses were in the lane next to the south side curb.

The simultaneous vibration data collected outside the building on the sidewalk and inside the building in the basement indicate background data well below the threshold of perception. The maximum vibration level

measured inside the basement was 72 dB, due to a bus traveling in the middle lane on H Street. Inside on the first floor of the building, the maximum vibration level measured was 83 dB.

The noise measured inside the building in the basement was mainly due to the vending machines. Noise from traffic can be heard inside the building at the first floor entrance area; however, people engaged in conversation generally produce higher noise levels.

2.5.4.2 Analysis

Because the rubber tires and suspension systems used on buses and trucks provide vibration isolation, it is unusual for these vehicles to cause excessive ground-borne noise or vibration when operating over smooth pavement. Most vibration problems are related to uneven street pavement due to potholes, bumps, expansion joints, manholes, or other road surface irregularities. An increase of about 10 dB can be expected if there is unusual roughness in a road surface. H Street in the study area can be characterized as having rough pavement.

Review of the measured vibration levels indicates that the maximum vibration levels generated by traffic on H Street range from L_{max} of 70 to 81 dB. These levels are typical of buses and heavy trucks operating over rough pavement. For receptors located along the south side of H Street, the maximum vibration levels are similar to those levels of the pre-action condition. A 5 dB increase in maximum traffic vibration levels can occur for receptors along the north side of H Street as a result of the parking lane removal. Since the new lane is used as a left-turn-only lane, traffic traveling in this lane is normally of a lower volume.

The outside vibration levels generated by traffic on H Street are well below the FTA criteria of 95 dB for structural damage to extremely fragile historic buildings. However, the measured vibration levels are above the threshold of perception and in some cases exceed the FTA criteria for human annoyance. The vibration levels measured inside the sensitive receptors are also well above the threshold of perception and also exceed the human annoyance threshold.

The total traffic volumes on H Street have increased compared to pre-action conditions. The traffic path on H Street in the area has been changed from two directions (east and west) to one direction (east). A parking lane on the north side of H Street was converted to a traffic lane after the security action was implemented.

Although traffic conditions have changed as a result of the security action, the type of vehicles, such as Metro buses and tour buses as well as heavy trucks, would be the same as in the pre-action conditions. Maximum vibration is normally due to a single event such as a bus or a heavy truck traveling by the receptor. Therefore, the pre-action maximum vibration levels due to traffic for receptors located along the south side of H Street (Decatur House and Dolley Madison House) would be similar to that of the measured data. For receptors located along the north side of H Street (Ashburton House and the Chamber of Commerce), the pre-action vibration levels occurring at these receptors would have been lower than that of the measured data because the pre-action parking lane would have provided a buffer zone. Although the maximum vibration levels would not be increased, the number of vibration events would be increased due to the increase in traffic volumes on H Street.

The pre-action vibration measurements conducted for the 1994 report at the Decatur House were measured in terms of PPV. As described in Section 2.5.2, post-action vibration levels were measured using RMS, which is suitable for measuring both building vibration and human annoyance response. PPV is not suitable for measuring human response. In order to provide a comparison of data between the pre- and

post-action vibration conditions, a standard 10 dB adjustment from PPV to RMS was used. With this conversion applied, the maximum pre-action vibration levels outside of the Decatur House would have varied from 60 to 81 dB. The post-action maximum vibration levels at Decatur varied from 58 to 74. The 1994 study also concluded that the vibration amplitude in the third floor of the building was about three times the vibration amplitude at the ground level. This represents an increase of about 10 dB in vibration level. The post-action measurements show an increase of 10-15 dB in the maximum vibration levels between the outside ground level and inside the building on the third floor.

Based on (1) the current analysis, (2) the comparison of the current analysis with the 1994 analysis at the Decatur House, and (3) the composition of the traffic, it can be concluded that existing structures in the area of the security action along H Street were exposed to traffic vibration of similar magnitude before the security action was implemented. The baseline vibration levels would have been below the building damage criterion for extremely fragile buildings. However, occupants in the sensitive receptors would have been exposed to vibration levels exceeding the human annoyance criterion even prior to the action.

2.5.5 Vibration Reduction Recommendations

While the analysis did not identify any major change in vibration levels between the pre- and post-action conditions, it did identify recommendations for consideration by DCDPW that would serve to reduce the vibration annoyance levels from truck and bus traffic along H Street. These are:

- smoothing the surface of the roadway in the blocks adjacent to the historic structures
- replacing the loose manhole covers along the roadway, and
- enforcing existing tour bus parking/idling restrictions on the south side of H Street.

2.6 VISUAL/AESTHETIC RESOURCES

2.6.1 Affected Environment

The natural features and viewsheds of the area have an appropriately symbolic role in the design of the city of Washington. Lafayette Park and the White House grounds were designed to offer reciprocal views from the White House area along the seven streets that radiate out from the site.

The study area for visual quality analysis covers a central portion of the original L'Enfant Plan and contains many important visual/aesthetic resources**.** Because views of the streets within the White House area rapidly diminish or are obscured by trees and modern construction, visual impacts would be negligible beyond the area where the vehicular traffic restrictions occurred. The study area for visual quality analysis encompasses the White House Complex.

2.6.2 Impacts Analysis

The restriction of vehicular traffic resulted in the following impacts to the visual environment:

- Removal of traffic from Madison Place and Pennsylvania Avenue, combined with the earlier restriction on Jackson Place. The security action unifies Lafayette Square with the White House. The visual intrusion of high-density urban automobile and truck traffic and tour-bus parking has been removed from these streets, resulting in a more pleasing visual environment and in improved

reciprocal lines of sight to the White House and the historic properties along Madison and Jackson Place from the Lafayette Square area.

- Placement of barriers near the intersections of Pennsylvania Avenue with 17th and 15th Streets and at the intersection of H Street with Madison Place and Jackson Place, and on the sidewalk along the north side of Lafayette Square. These barriers provide an adverse visual impact in those areas. These barriers are temporary, and will be replaced by a system of permanent security barriers in conjunction with the National Park Service's Long Term Design Plan for Pennsylvania Avenue.

- Placement of the barriers in sections along E Street, to allow traffic to proceed eastbound while prohibiting entry onto the westbound lanes, and at the intersection of State Place and 17th Street and across South Executive Avenue and E Street. These temporary concrete barriers detract from the visual environment in the Ellipse, the southern section of the White House grounds. A combination of concrete barriers and planters is placed along portions of the center line on E Street, across State Place at 17th Street, and where South Executive Avenue intersects E Street. The barriers are also placed along the sidewalk on the north side of E Street west of South Executive Avenue and north along the east side of 17th Street to State Place, and east of East Executive Avenue and north along the west side of 15th Street to Hamilton Place. The barriers intrude upon the viewshed that includes the White House south lawn, and the south face of the Treasury Building and the Sherman Monument, the south face of the Executive Office Building, and the First Division Monument, and provide an adverse visual impact. A design proposal is being prepared for the replacement of the temporary barriers now placed along E Street and State Place.

  The NPS is developing a Comprehensive Design Plan for the White House that includes the entire area from H Street to Constitution Avenue and 15th to 17th Streets. This plan will, among other things, address the preservation of the historic integrity and character of the monumental buildings and landscapes.

2.7 CULTURAL RESOURCES

2.7.1 Affected Environment

This section describes the conditions related to existing historic sites and resources. Historic resources within the extended study area were evaluated by the NPS and are described in the documents, *President's Park Cultural Landscape Report: Site History, Existing Conditions, Analysis, and Evaluation* (NPS, EDAW, Inc., Land and Community Associates, Cynthia Zaitzevsky & Associates, John Milner Associates, draft May 1995), and *Interim Cultural Landscape Report* (NPS, O'Brien, December 1994). The following description uses information from these reports as well as other sources cited in Chapter 5: References.

2.7.1.1 Site History

The historic development within the extended study area has been overwhelmingly dominated by the L'Enfant Plan elements and the federal presence. The District of Columbia was created as the Federal City, and designed in a fashion that would not be completed for many generations and that allowed for anticipated growth.

Eighteenth Century

Prior to their purchase by the federal government in 1791, the two parcels of land that later became the White House property were owned by Edward Peerce and David Burnes. The Peerce property occupied the northern portion of the site, including Lafayette Park. The southern portion, owned by David Burnes, covered the area of the Ellipse, Sherman Square, the First Division Monument, and the south White House grounds.

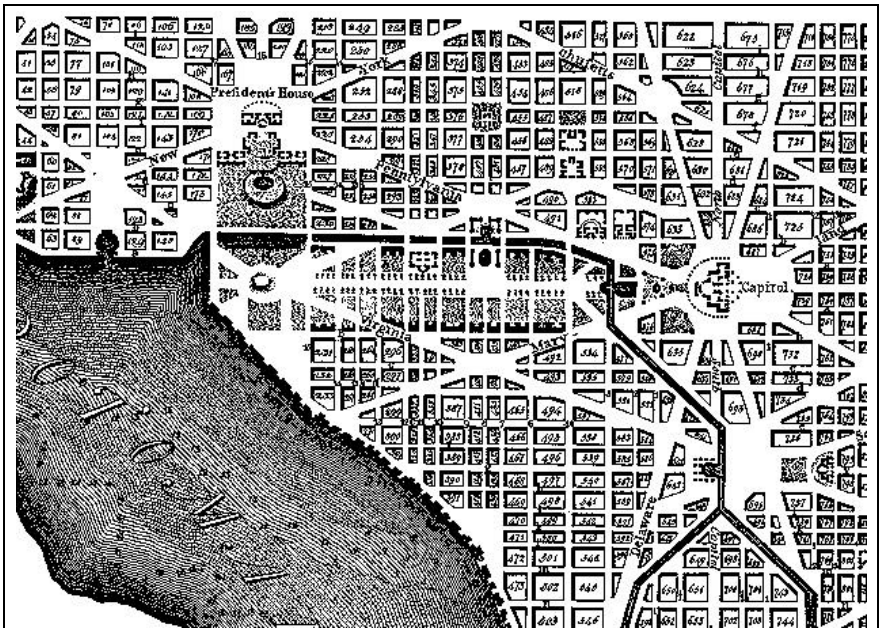
L'Enfant emphasized his concern to create a city of beauty and magnificence. His plan for the city combined considerations for the topography of the city as well as views from one topographical feature to another. Views of the different natural features and the symbolic structures built on the sites are provided by avenues that connect them. Imposed upon this system of views, connecting avenues, and open spaces was a grid street system that provided for efficient use of the land. The central feature of L'Enfant's plan was the intersection of three axes, creating a triangle. The axes are formed by the open space connecting the White House (then called the Presidential Palace or the President's House) to the Washington Monument (then called the Washington Statue); the Mall area, connecting the Washington Monument to the Capitol (then called the Congress House); and the connection from the Capitol to the White House along what L'Enfant called the "Grand Avenue," which eventually became Pennsylvania Avenue.

Although his basic plan was used, L'Enfant was dismissed in February of 1792, following difficulties with Congress and the planning commissioners. Andrew Ellicott replaced L'Enfant, and continued to refine L'Enfant's original plan for the city.

L'Enfant's plan placed the White House on an 82-acre site on Talbot Terrace, one of the highest rises of land arching westward from the center of the city. Four of the major avenues were designed to radiate outward from the White House, emphasizing its symbolic importance. Pennsylvania Avenue, as well as New York Avenue, ended at one side of the open area surrounding the President's residence and resumed on the opposite side. Figure 2-9 presents the central portion of the Ellicott Plan of Washington, 1792, which shows the plan for the President's House and its site, including what is now Lafayette Park but what was then a contiguous part of the property surrounding the President's House.

1800-1850

In 1801, during his tenure as President, Thomas Jefferson decided that the plaza to the north of the



President's House, which had been used for a carpenter's workshop and a temporary workmen's village during construction of the White House, then a market and racetrack after, should be a public park, and separated it from the grounds of the President's House. In 1818, work began on grading the site now called Lafayette Park. This may have been the impetus for the official extension that occurred by 1824 of the section of Pennsylvania Avenue between 15th and 17th streets in front of the White House. Some sort of roadway probably existed at the present location of Pennsylvania Avenue as early as 1796, and a road, although not designated as Pennsylvania Avenue, was constructed north of the President's House grounds in 1811.

President Jefferson had a stone enclosure wall built on the south grounds of the White House in 1807-09 which, along with assorted gateways, drives, and paths, defined the south grounds until the post-Civil War period when the enclosure was expanded to the south. The original War Department and Treasury buildings were reconstructed following the burning of the White House in 1814. The lower part of the south grounds outside the Jefferson wall including the later First Division Memorial site remained undeveloped during the first half of the 19th century.

The mouth of Tiber Creek to the south was converted into a canal basin for the C & 0 and Washington City canals between 1802 and 1831 and a bulkhead constructed along the former north bank of the creek. Filling occurred along the alignments of 15th and 17th Streets southeast and southwest of the White House to allow their construction. Filling continued on the Ellipse throughout the 19th century.

1850-1900

Andrew Jackson Downing's plan for the Ellipse was implemented 1851-52 with an elliptical arrangement of drives, paths, and plantings. The new Treasury building was begun in 1836 and completed in stages by 1869. About 1871, the White House grounds were extended south, forming a semicircular enclosure. East, West, and South Executive Avenues were created and a new enclosure fence erected. State and Hamilton Places were constructed about this time as well.

East Executive Avenue was constructed in 1866, and West Executive Avenue was constructed and connected to the eastern portion around 1871. At this time, the road was a private drive, within the boundaries and fences of the White House grounds. Executive Avenue would later be opened to the public.

During the 1870s, the City of Washington and the U.S. Army Corps of Engineers began a massive street and utility improvement program that resulted in the Washington City Canal being converted to an enclosed sewer and the construction of modern Constitution Avenue.

1900-1950

In 1901, the McMillan Commission was formed to guide development of urban planning for the City of Washington following the City Beautiful ideal first expressed at the World's Columbian Exposition of 1893. Although its influence on the Mall and other areas of the city was great, its impact on the White House was limited. The Sherman (1902-05) and First Division Monuments (1924) were, however, created as expressions of the City Beautiful ideal. About the same time that Sherman Park was created, plans were drawn up to cut E Street through from 15th to East Executive Avenue, severing it from the Ellipse. However, the exact construction date is not clear.

In 1933 the NPS took over management of the White House, Lafayette Park, and the Ellipse from the U.S. Army Corps of Engineers. E Street was realigned and improved between 14th and 15th Streets in

1933, which resulted in the use of E Street-State Place as a means of crossing the grounds. Finally, in 1940, E Street was cut through to 17th Street resulting in its present alignment. Lafayette Park was renovated and partially redesigned by the NPS in 1937.

West Executive Avenue was closed on October 29, 1942, during World War II, but never reopened to the public. East Executive Avenue was permanently closed to vehicular traffic in September 1982, following an extended experimental closing which began in July 1981. It had earlier been closed for a short time during World War II but had reopened afterward. It was redesignated "East Executive Park" and was redesigned for use as a pedestrian walkway.

2.7.1.2 Historic Sites/Districts

There are 99 historic sites and 8 districts in the extended study area. The greatest concentration of these sites and districts is within a two-block area surrounding the site of the security action. All of the L'Enfant Plan elements, including the squares, circles, vistas, and major elements created by the plan of the Federal City, are listed on the National Register of Historic Places as well as the District of Columbia Inventory of Historic Sites.

There are, close to the area of the security action, several historic districts or historic sites that span large areas and contain large numbers of buildings. These include the Lafayette Square Historic District, the Fifteenth Street Financial Historic District, the Federal Triangle Historic Site, the National Mall Historic Site, and the Pennsylvania Avenue National Historic Site. Those buildings located within historic districts that contribute to the character of the historic district are protected.

Sites and districts on the list are protected under various regulations. Privately owned and District-owned properties are protected by the D.C. Historic Protection Act; federally eligible or listed properties, including National Historic Landmarks, are protected under Sections 106 and 110 of the National Historic Preservation Act; and properties owned by foreign governments and international organizations are protected under the Foreign Missions Act of 1982 and the D.C. Historic Protection Act.

Appendix A contains complete information on all of the historic sites and districts in the extended study area. Dates are indicated for all historic designations, including the District of Columbia Inventory of Historic Sites (DC), National Register of Historic Places (NR), and National Historic Landmark or Site Designation (NHL/S). The sites are described as provided in the 1995 District of Columbia Inventory of Historic Sites. See Figure 2-10 for a map of the historic site locations. Table 2-16 is an alphabetical listing of all of the historic sites and properties in the extended study area.

2.7.1.3 National Historic Preservation Act Requirements

Section 106 of the National Historic Preservation Act of 1966 requires that a federal agency take into account the effect of any federally funded undertaking (Action) on any property listed on or eligible for the National Register of Historic Places. The federal agency must afford the State Historic Preservation Office (SHPO), which in Washington is the District of Columbia Historic Preservation Review Board or the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment with regard to the undertaking.

The Department of the Treasury initiated the Section 106 process shortly following the undertaking of the emergency security action, on August 25, 1995. The Department issued a letter to the SHPO and the ACHP describing the security action. In December of 1996, a complete list of historic sites within the

extended study area was forwarded to the SHPO and ACHP. The impacts analysis and findings are described in Section 2.7.2.

On May 14, 1997, the Department of the Treasury sent a letter to the SHPO and ACHP stating that Treasury considers the temporary barriers to represent an adverse visual effect on a number of historic sites and requesting development of a Memorandum of Agreement to resolve the issue of adverse effects. These barriers will be replaced by a system of permanent security barriers in conjunction with the NPS *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park*.

Table 2-16: Historic Sites and Districts in the Extended Study Area

DC. Dupont Circle Historic District
FT. Federal Triangle
FS. Fifteenth Street Financial Historic District
LS. Lafayette Square Historic District
NM. The National Mall
PA. Pennsylvania Avenue National Historic Site
SS. Seventeenth Street, West Side between New York and Constitution Avenues
LP. L'Enfant Plan Elements 1791; 1901

1. Alibi Club
2. Almas Temple
3. American Institute of Pharmacy
4. American Red Cross
5. American Peace Society
6. American Security and Trust Company
7. Army Navy Club
8. Arts Club of Washington
9. Ashburton House (St. John's Parish)
10. Bachelor Apartment House
11. Barry (Commodore John) Statue
12. Blair House (Blair Lee House, President's Guest House)
13. Bond Building
14. Brownley Building
15. Bulfinch Gatehouses
16. Carlton Hotel (Sheraton Carlton Hotel)
17. Carnegie Endowment for International Peace
18. Champlain Apartment Building (Orme Building)
19. C&P Telephone Company, Old Main Building
20. C&P Telephone Company, Main Building Addition
21. Church of the Ascension and St. Agnes
22. Church of the Epiphany
23. Colorado Building
24. Commercial National Bank
25. Concordia United Church of Christ and Rectory
26. Corcoran Gallery of Art
27. Cutts Madison House (Dolley Madison House)
28. Daughters of the American Revolution, Memorial Continental Hall
29. Daughters of the American Revolution, Constitution Hall
30. Decatur House
31. Department of the Interior (New Interior Building)
32. District Building
33. Farragut (Admiral David G.) Statue
34. Federal Reserve Board
35. Federal American National Bank (and Interior)
36. Franklin School
37. Franklin Square
38. Garfinckel's (Julius Garfinckel & Co.)
39. Harris & Ewing Photographic Studio
40. Hibbs Building (Folger Building)
41. Homer Building
42. Hotel Washington
43. I Street, South Side of 2000 Block (Red Lion Row)
44. I Street, 2030
45. Kosciusko (Brigadier General Thaddeus) Monument
46. Lafayette (Major General Marquis Gilbert de) Monument
47. Lisner Auditorium, GWU
48. Lockkeeper's House, C&O Canal Extension
49. Masonic Temple (Museum of Women in the Arts)
50. Metropolitan African Methodist Episcopal Church
51. Metropolitan Club
52. McPherson (Brigadier General James B.) Statue
53. Michler Place
54. National Academy of Sciences
55. National Metropolitan Bank Building
56. National Savings and Trust Company (National Safe Deposit Company)
57. Octagon House (Tayloe House)
58. Pan American Union (Organization of American States)
59. Pennsylvania Avenue, 1911
60. President's Office, GWU
61. Pulaski (Brigadier General Count Casimir) Statue
62. Pullman House (Russian Embassy)
63. Rawlins Park
64. Rawlins (Major General John A.) Statue
65. Alexander Ray House (Steedman Ray House, 1925 F St. Club)
66. Renwick Gallery (Old Corcoran Gallery)
67. Riggs Building (Albee Building)
68. Riggs National Bank
69. Ringhold Carroll House (John Marshall House)
70. Rochambeau (Major General Comte Jean de) Monument
71. St. John's Church
72. St. Mary's Episcopal Church (St. Mary's Chapel)
73. Schneider Triangle
74. Second National Bank
75. Sherman (General William Tecumseh) Monument
76. Southern Building
77. Square 38, Designated Properties
78. State, War and Navy Building (Old Executive Office Bldg)
79. Stevens School
80. Stockton Hall, GWU
81. Strong (Hattie M.) Residence Hall, GWU
82. Sumner (Charles) School
83. Sun Building (American Bank Building)
84. Swartzell, Rheem and Hensey Building (Playhouse Theatre)
85. Tayloe (Benjamin Ogle) House
86. Thomas (Major General George H.) Statue
87. Treasury Annex
88. Treasury Department
89. Underwood House (GWU)
90. Union Trust Company (First American Bank)
91. U.S. Chamber of Commerce
92. Van Ness House Stables
93. Major General Frederick Wilhelm Von Steuben Monument
94. Warner Theater Building (and Interior)
95. Washington Statue
96. The White House
97. Willard Hotel
98. Winder Building
99. Woodhull House (GWU)

Figure 2-10: Historic Sites and Districts in the Extended Study Area

2.7.2 Impacts Analysis

2.7.2.1 Historic Site Impacts Methodology

This historic resource impacts assessment considered whether the changes in traffic, noise, vibration, air emissions and the visual environment would detract in any way from those factors that support the historic designation of the structures, district or sites in question. The criteria for D.C. historic landmark and historic district designation and the National Register criteria for evaluation, as provided in the District of Columbia Inventory of Historic Sites, describe the qualities or values that potential historic sites must possess to garner official designation and protection. This information, along with the description of each site as provided in Appendix A of this document, provide the basis for evaluation of the historic qualities of each site and the potential impact of the security action on those qualities.

Based on the criteria of effect and adverse effect established by the Advisory Council on Historic Preservation, a determination was made for each site as to the following factors, which may constitute an adverse effect:

1) Physical destruction, damage, or alteration of all or part of the property;
2) Isolation or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register or District of Columbia Landmark designation;
3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
4) Neglect of a property resulting in its deterioration or destruction; and,
5) Transfer, lease, or sale of the property.

Although the description of the existing conditions lists all historic properties and districts within the extended study area, the analysis of impacts to these sites finds that the effects are sufficiently minimal beyond the area of the vehicular traffic restrictions. Potential historic resource impacts from this security action are related primarily to visual, air quality, noise and vibrations effects.

2.7.2.2 Analysis of Impacts to Historic Sites

The Historic Sites Impacts Analysis Table in Appendix B provides a summary of the analysis of impacts at all sites based on the five factors listed above. The effects are classified according to the following scheme: Adverse, Not Adverse, and No Effect.

Of the 107 sites and districts listed in the table in Appendix B, 77 are not affected by the security action. Of the remaining 30 sites, 27 sites are adversely effected by the placement of the concrete security barriers associated with the vehicular traffic restrictions. The placement of these barriers alters the character of and in some cases isolates a property's setting (Item 2 in list of factors indicating potential effect, above and in Appendix B) and introduces a visual element that is out of character with the property (Item 3, above and in Appendix B). These barriers will be replaced by a system of permanent security barriers in conjunction with the NPS *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park*. These barriers constitute a permanent or long-term impact at these sites.

Imperceptible noise increases (increases of less than 3 dBA) were found near five sites. Although these sites may be affected by these minor noise increases, which result from slight increases in traffic, they are imperceptible to the human ear, and do not introduce audible elements that are out of character with the property. Therefore, the effects on these sites are considered not adverse.

At 17 sites, the removal of vehicular traffic and the decreased noise levels constitute visual and audible effects of the security action that are considered not adverse.

See the Historic Sites Impacts Analysis Table in Appendix B for the analysis of each individual site.

2.8 PEDESTRIAN ACCESS

2.8.1 Affected Environment

Pedestrian facilities in the extended study area include sidewalks along streets, crosswalks at intersections, and walkways through the parks and squares. These facilities are enhanced in selected locations to accommodate high numbers of tourists, including wider sidewalks at such locations as along Pennsylvania Avenue between 15th and 17th Streets. Locations where traffic had previously been restricted were converted to pedestrian use, such as East Executive Avenue.

2.8.2 Impacts Analysis

The security action did not restrict pedestrian access and in fact increased it by creating a traffic-free zone on Pennsylvania Avenue between Madison Place and 17th Street. The White House Security Review recommended not only that vehicular traffic be prohibited from traveling along Pennsylvania Avenue but also that the area be converted to a pedestrian mall. The Security Review notes that "Based on consultations with experts on security, public access, and the history of the White House, it is the opinion of the Review that this proposal will provide the general public with maximum pedestrian access to our nation's most important historic structure while averting a verified security concern" (White House Security Review, Pg 42).

The FHWA transportation analysis states that conflicts between traffic and pedestrians are well managed in the extended study area, with the exception of locations around the Farragut West Metrorail station on I Street and at the Connecticut Avenue-17th Street-K Street intersection. These conflicts existed before the security action.

The FHWA transportation analysis includes a discussion of the effects upon tourists. The analysis states that observations of tourists and visitors on both weekdays and weekends showed no effect upon pedestrian access in the area. The analysis describes a survey of tourists and visitors in the White House area. The survey found that 85.1 percent of the people surveyed said that the vehicular traffic restriction did not cause a problem in their access to the area. Of those people who said that access was a problem, the reasons given were that parking was too far away and that the walking distances were too long.

Information on pedestrian accidents was sought to assess whether the security action affected the risk to pedestrians. Systematically compiled pedestrian-accident information are available from the DCDPW only for 1995. The data show that there were seven pedestrian-vehicle accidents in the vicinity of the White House in 1995. Four occurred before the security action and three afterward. The small number of accidents and the short amount of time for which data are available do not demonstrate any patterns that would indicate impacts.

2.9 SOCIOECONOMIC IMPACTS

2.9.1 Affected Environment

The extended study area for the socioeconomic impacts analysis includes only minor areas of residential land use in the northern fringes as well as the student population associated with George Washington University to the west of the site of the security action. The extended study area almost entirely comprises governmental/institutional and commercial/retail uses. Therefore, discussion of the socioeconomic environment includes a review of public service facilities and a discussion of economic conditions related to parking issues.

2.9.1.1 Public Service Facilities

This section describes all public service facilities that exist within or near the extended study area. Because the land use in the extended study area is primarily commercial and/or governmental, facilities normally associated with residential communities do not exist in the same number in the extended study area as they would in those communities.

Educational Facilities - The extended study area encompasses or borders several major national educational institutions, including George Washington University, the National Geographic Society, and the Smithsonian Institution. Other colleges include Strayer College and National-Louis University. The extended study area also contains primary and secondary schools, including Stevens Elementary School, Thompson Elementary School, Franklin Adult Education Center, and Grant School Without Walls Senior High School. A public library is located at 24th and L Streets.

Religious Facilities - Religious facilities in the extended study area include St. Johns Episcopal Church, located on the corner of 16th and H Street, directly across from the Lafayette Square; the Third Church of Christ, Scientist, at 16th and I Streets; The Church of the Epiphany at 13th and G streets; New York Avenue Presbyterian Church at New York Avenue and H Street; and United Church of Christ at 20th and G Streets. Many of these churches attract congregation members from outside of the extended study area.

Emergency Facilities - The Ambulatory Care Center at George Washington University Hospital is the only emergency health-care facility within the extended study area. Emergency facilities and services possibly affected by the street restrictions in the vicinity of the White House include police, fire and emergency medical technician (E.M.T.) vehicles administered by the District of Columbia. Police responses may be unaffected by street restrictions since dispatches are sent to mobile units. The response zones are overlapping and are defined by the nearest unit rather than a specific zone. There are private ambulance services operating in D.C., but these are primarily used for inter-hospital transfers and home-to-hospital requests. All emergency calls to 911 dispatch a city ambulance.

There are thirty-two fire companies in Washington, D.C. These companies have been sited in response to general patterns of residential and business district growth. The response boundaries are defined by a combination of the density of development and the response time. These boundaries slightly overlap and are not distinct, but generally represent a box around each fire station. There are three fire companies with local alarm or first-due responsibility that includes runs through streets that are now closed to general traffic: Engine Company 16 on 13th Street between K and L Streets, Engine Company 23 on G Street between 21st and 22nd Streets, and Engine Company 1 on 23rd Street at L Street. There are two engine companies with peripheral response zones in the extended study area: Engine Company 2 at 6th and F Streets and Engine Company 13 at 6th and E Streets, S.W.

There are thirteen E.M.T. units and thirteen life support E.M.T. units in 26 fire houses in D.C. Both Engine 16 and Engine 23 have E.M.T. units housed with the engines. The E.M.T. units do not have specific dispatch zones.

Emergency vehicles are not restricted from access to or through streets where public vehicular traffic has been restricted as part of the security action.

Health-Care Facilities - The only health-care facility in the extended study area is George Washington University Hospital, located in the western portion of the extended study area.

Commercial Services - Post Offices exist at 21st and M Streets, 18th and M Streets, 14th and K Streets and in the Federal Triangle complex at 12th Street and Pennsylvania Avenue.

Hotels in the extended study area include the Hay-Adams Hotel at 16th and H Streets, the Willard Hotel and the Marriott Hotel, both at 14th Street and Pennsylvania Avenue, the Hotel Washington at 15th and F Streets, the Sheraton Carlton Hotel at 16th and K Streets, the Capital Hilton Hotel at 16th and L Streets, the Mayflower Hotel at Connecticut Avenue and DeSales Street, the State Plaza Hotel at 21st and F Streets, the Allen Lee Hotel at Virginia Avenue and F Street, the Madison and Vista Hotels at 15th and M Streets, the Holiday Inn on Thomas Circle, and the Days Inn at 12th and K.

Major retail sites within the extended study area include the Shops at National Place at 14th and F Streets, Hechts Department Store at 12th and G Streets, and various shops along Connecticut Avenue and K Streets. Small shops are interspersed throughout the extended study area, and include restaurants and cafes, drycleaners, banks, copy services, office supply stores, retail shops, tourist memorabilia shops, small grocers and convenience stores, and pharmacies. Most of the streets of the downtown business district and tourist area are lined with small food and souvenir vendors and carts.

Park and Recreation Facilities - Park facilities in the extended study area include a number of public parks. These parks are part of the L'Enfant Plan, and include Lafayette Square, Franklin Square, Farragut Square, McPherson Square, Washington Circle, and Thomas Circle.

There are numerous Metrorail stations in the extended study area, including Farragut North, Farragut West, Foggy Bottom/GWU, Metro Center, Federal Triangle, and McPherson Square stations.

2.9.1.2 Economic Characteristics

The economy of Washington, D.C. is based on the presence and operation of the federal government and associated private industries and on the tourism industry. The extended study area comprises primarily commercial/retail and governmental/institutional activities.

Most of the people who work in the extended study area commute from the outlying residential areas of Washington and from suburban Maryland and Virginia. These commuters use either Metrorail, Metrobus, or private automobile to get into the core business/federal area. The site of the security action is at the center of much of this commuting activity.

2.9.2 Impacts Analysis

2.9.2.1 Public Facilities

The security action will not generate or effect any change in the number or distribution of the resident or working population in Washington, D.C., or in the extended study area. The security action will not, therefore, affect the capacity of the educational facilities in the extended study area to provide educational services. It will not affect the capability of churches in the area to provide religious services. It also will not affect the capacity of the only health-care facility in the extended study area, the George Washington University Hospital, to provide health-care services. Because no additional population will be located in

the extended study area as a result of the security action, it also will not affect the capacity of local commercial operations to provide commercial services. The public facilities in the extended study area, including the parks and historic attractions such as the White House and Decatur House, are used by tourists as well as residents from outside the extended study area. The security action is not anticipated to adversely affect the number of tourists who visit the city. It will, however, improve the pedestrian and visitor experience at the White House. It may have had the effect of increasing driving times for some commuters.

According to Chief Alvin Carter, Public Affairs officer with the D.C. Fire Department, the Fire Department has determined that the security action had minimal effect upon response times and so has no plans to alter any of the response zones as a result of the security action. First alarm runs in the areas close by the White House have been slightly altered by Engine Companies 16 and 23 to avoid the restricted streets. Engine Company 16, when responding to a dispatch in the Foggy Bottom area, now travels down K Street instead of using Pennsylvania Avenue. The same is true for Engine Company 23 responding to any dispatches in the Federal Triangle area.

Any building fire requires four engines to respond, which is known as a box alarm. As with the first-alarm blazes, runs in the areas close to the White House have been slightly altered by Engine Companies 16 and 23. The second-response engines might have to alter their run around the area of the vehicular traffic restrictions, but there are enough alternate routes so that response times have not been adversely impacted.

The E.M.T. units operate based on which unit is available and closest to the dispatch area. The street restrictions have minimally affected the response times in the area close to the security action. Dispatchers have not changed nor do they expect to change their dispatch assignments due to the security action.

No municipal police stations exist within the extended study area, although several are just outside the extended study area.

2.9.2.2 Economic Impacts Analysis

The analysis of the economic impacts of the security action identified three types: (1) the effect on revenue caused by changes in on-street parking, (2) the change in Metrobus operating costs, and (3) capital costs of modifications to facilities to accommodate traffic operational changes. The analysis of these impacts forms the basis for the discussion of economic impacts. The security action did not require the taking or closing of any business.

In some areas, metered parking spaces were removed by the DCDPW to clear additional lanes for traffic, as part of the June traffic management response. The security action and the traffic management responses reduced the amount of on-street parking by 49 spaces on 12 blocks within the extended study area. The net loss of 49 spaces will result in 1,203 less space hours per week which translates into an annual revenue loss for the District of Columbia of approximately $98,000.

The security action required changes in Metrobus routes and schedules that increased the amount of bus miles necessary to maintain bus service levels, which added to the costs of operations. WMATA calculated the increased Metrobus operating cost to the District of Columbia to be about $314,000 per year.

Capital costs to the District of Columbia comprise modifications to facilities that were made to accommodate operational changes resulting from the security action. Construction at the intersection of

15th Street and H Street to accomodate Metrobuses costs approximately $25,000. Relocations of passenger-waiting shelters for Metrobuses cost approximately $40,000.

In addition, DCDPW will shortly seek bids to reconstruct the intersections of 13th Street and H Street as well as 19th Street and H Street. The reconfiguration of the traffic islands at these intersections is necessary due to the change in direction of H Street. The estimated cost of the reconstruction of these intersections is $50,000.

2.10 NATURAL RESOURCES

2.10.1 Affected Environment

The original siting of the White House was determined with consideration of local topography and hydrology. The present location is on a terrace with a relatively higher elevation than the surrounding area; this higher elevation also reduces the effect of flooding from the adjacent Potomac River.

2.10.1.1 Geology and Soils

The District of Columbia lies along the fall line at the geologic boundary between the Atlantic Coastal Plain and Piedmont Plateau. The downtown area of Washington is on the nearly level lowlands of the Coastal Plain, of which this part is underlain by poorly consolidated sediment. The area surrounding the White House is underlain either by river terrace deposits, for most proximate areas north of the Ellipse, or by alluvium and artificial fill, for most proximate areas south of the Ellipse. These deposits are generally composed of gravel, sand, silt, and clay of the lowest stream terraces and bottoms.

The Soil Conservation Service (now renamed the Natural Resource Conservation Service) identified the soils of the area surrounding the White House as being either of the Urban Land-Beltsville-Chillum association or of the Lafayette Park and the adjacent north area of the Udorthents association.

2.10.1.2 Vegetation

Vegetation in this area has been heavily manipulated to establish and define an appropriate setting for the White House, the Mall, the Ellipse, and the surrounding area. Vegetation species that have been identified for planting were selected for aesthetic reasons but were also selected to provide some form of climate control and some measure of privacy.

Typical of the vegetation in this area, the predominant vegetation consists of designated plantings of mixed deciduous shade and canopy trees. This area also contains deciduous ornamental trees, foundation plantings of evergreen and deciduous shrubs, and ground covers, such as lawn grass.

2.10.1.3 Wildlife

Gray squirrels are abundant throughout the city, and are the most visible diurnal mammal. In parklands and other open space areas, raccoon and opossum are common nocturnal species that often invade the residential communities in search of food. Numerous additional small mammals, including cottontail rabbits, muskrat, native rodents, and bats, can be found in many locations where appropriate habitat or food is available. The parklands and open-space areas also support a wide variety of terrestrial birds, including the seemingly ubiquitous pigeons and doves.

2.10.1.4 Threatened or Endangered Species

The Endangered Species Act of 1973 (16 U.S.C. Sections 1531-1544) requires that federal agencies consult with the U.S. Fish and Wildlife Service (FWS) to ensure that any action authorized, funded, or carried out by that federal agency does not jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat of such species. Specifically, Section 7 of the Endangered Species Act requires that the federal agency proposing the action contact the FWS or the National Marine Fisheries Service (NMFS) for an official list of endangered, threatened, and proposed species that may be present in the area of a proposed project.

Coordination with representatives of the FWS has occurred regarding this security action. Except for occasional transient individual animals, no federally listed or proposed threatened or endangered species are known to exist in the area of the security action. The FWS expressed no concerns regarding this action.

2.10.2 Impacts Analysis

Because the security action does not involve any ground disturbance, it does not impact either the geology or the soils of this area. The security action does not involve any removal of vegetation. It does not, therefore, negatively impact any vegetation in the area. The security action does not involve any ground disturbance nor any removal of vegetation. It will not impact any wildlife or their habitat in the area of the security action. The species of terrestrial wildlife, including birds, within the area of the action are very adapted to living in this highly urbanized area . Because there are no known threatened or endangered species within the area of the security action, no involvement with any proposed or listed threatened or endangered species, nor their designated critical habitat, would occur as a result of the security action.

2.11 CUMULATIVE EFFECTS

This section discusses the environmental effects that may occur cumulatively with the security action to restrict vehicular traffic in the vicinity of the White House, as a result of implementation of other projects in the extended study area, whether planned, currently underway, or completed. A cumulative effect is defined in 40 CFR 1508.7 as the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Therefore, for each resource affected by the security action, the EA should identify all other actions that may affect the resource, and, to the extent reasonably possible, assess the cumulative effects.

The extended study area is a mature urban area that is not subject to extensive development pressures. The core study area, in fact, comprises numerous historic buildings and lands that are largely protected from further development. In the extended study area, few major developments have taken place recently, are occurring now, or are planned in the foreseeable future. This extended study area includes mostly office and retail buildings with little vacant land for construction of new buildings or development of other projects. Parkland and the street system comprise much of the remaining land. In some instances, older structures have been replaced by newer buildings, but the land uses remain generally the same.

There is one major development under construction within the extended study area. There are also several major developments being constructed or in various stages of planning outside of but near the extended study area. The major developments that would have potential cumulative environmental effects when combined with the security action are described and discussed below.

2.11.1 Extended Study Area Projects

Within the extended study area, there are two projects underway: (1) the construction of the Ronald Reagan Building, a new federal office building on 14th Street between Pennsylvania Avenue and Constitution Avenue; and (2) the *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park*, which is an element of the Comprehensive Design Plan for the White House.

The Ronald Reagan Building. The Ronald Reagan Building is a 3.1 million-square-foot facility that will house various federal agencies, the Woodrow Wilson Center, and the International Trade Center. The federal tenants of the building include the U.S. Agency for International Development (USAID), U.S. Customs Service, and the Environmental Protection Agency (EPA). The building is being constructed in the Federal Triangle under the direction of the General Services Administration (GSA) on a parcel that was formerly used as an 1,800-space surface parking lot. The building will also have four basement levels that will include approximately 1,930 parking spaces. The net increase in parking at this location would be limited to a gain of 130 spaces, compared to conditions prior to construction of the building. A large amount of retail space is also planned for the building. Occupancy of the building will begin in early 1997 and is scheduled to be completed by early 1999. Approximately 6,600 employees are expected to occupy the Ronald Reagan Building.

In addition to the construction of the Ronald Reagan Building, the federal government is also renovating two other buildings in the block bounded by Pennsylvania Avenue, 12th Street, Constitution Avenue, and 14th Street. These two structures are the Ariel Rios Building, located at 12th Street and Pennsylvania Avenue, and the Customs Service Building, fronting on Constitution Avenue between 12th Street and 14th Street. Additionally, the John A. Wilson Building (formerly known as the District Building), which is located at Pennsylvania Avenue and 14th Street, is being renovated to accommodate District and federal employees.[6] The renovation of these buildings would not increase the number of employees in the area and so would not affect traffic volume.

Consideration of potential cumulative impacts associated with the Ronald Reagan Building focused on the combined effects of the generation of new traffic on local streets (principally 14th Street) by occupants of the building with traffic diversions created by the security action. The building will have one vehicular entrance on Pennsylvania Avenue and two on 14th Street. Both of the 14th Street entrances will have traffic signals.

The two entrances on 14th Street are of particular concern due to the current peak-period congestion on that street, especially during the P.M. peak hour for southbound traffic exiting the building. In the P.M. peak period, vehicles exiting the building in the southbound direction will be required to use only the north portal of the parking garage in order to minimize queuing problems at the 14th Street/Constitution Avenue intersection. During the A.M. peak period, vehicles entering the building would use both entrances in the northbound direction on 14th Street but would be limited to the south entrance of the building from southbound 14th Street in order to avoid queuing on 14th Street in the vicinity of the 14th Street/ Pennsylvania Avenue intersection.

The effects of the traffic generated by the Ronald Reagan Building combined with the diversion of traffic resulting from the security action would be limited to potential effects on air quality (specifically carbon monoxide concentrations) at nearby congested intersections. As a result, an analysis of CO concentrations of the combined traffic for 1999 was undertaken at the 14th Street and Constitution Avenue and 14th and H Street / New York Avenue intersections. These two air quality analysis locations have the highest likelihood for violation of CO emission standards and would be the most affected by the cumulative impacts of the action with the Ronald Reagan Building. The analysis used regional planning estimates for growth, and traffic assignments based on the analyses performed for the security action and the Ronald Reagan Building. The analysis assumed that the integrated traffic management system (ITMS), an FHWA-funded traffic improvement project designed to improve traffic flow and reduce congestion in the District, will be in place. (See Section 2.3 for a more thorough discussion of air quality.)

The results of this analysis (Table 2-16) show that there would be no exceedences of national air quality standards (the NAAQS). CO concentrations on 14th Street and H Street / New York Avenue will be much improved over 1997 conditions, especially in the PM period. The decreases are due predominantly to the beneficial effects of the ITMS but also to the decrease in average fleet emission rates which occur over time. CO concentrations on 14th Street at Constitution Avenue would still be below the NAAQS, but could be slightly higher than in 1997 in the PM period. The increased CO concentrations would be caused by increased congestion on southbound 14th Street at Constitution Avenue.

Based on this analysis, no cumulative impacts of the Ronald Reagan Building with this security action are anticipated. In addition, GSA is preparing a Transportation Management Plan for the subject block that will address the issues of vehicular access and the Ronald Reagan Building. This plan is anticipated to include measures that will allow management of ingress and egress to the building.

Table 2-17
Maximum Ambient Carbon Monoxide Concentrations (ppm)
Cumulative Impact Assessment of the Security Action with the Ronald Reagan Building- AM and PM Peak Periods

	Analysis Location	1-hour (NAAQS = 35.0 ppm)		8-hour (NAAQS = 9.0 ppm)	
		AM	PM	AM	PM
#4	14th St. @ H St. & New York Ave.	7.2	9.8	4.8	6.7
#5	Const. Ave. @ 14th St.	9.9	12.3	6.7	8.4
	Const. Ave. @ 15th St.	9.6	9.0	6.5	6.1

NOTES:
1. 1-hour background concentration = 2.12 ppm
2. 8-hour background concentration = 1.27 ppm

White House. The *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park* [7] is a project designed to improve the appearance of the area bordered by Pennsylvania Avenue, 15th Street, 17th Street, and H Street; to maintain vehicular access for official government uses; and to accommodate special needs, such as presidential inaugural parades and First Amendment activities. The environmental assessment for this plan was initiated subsequent to the security action. Major elements of the preferred alternative, as presented in the environmental assessment prepared for the plan, call for removal of parking along Jackson Place (permit parking) and enhancement of the visual landscape, in part, by removing temporary barriers, installing permanent security barriers and new fountains, and extensive landscaping.

The potential adverse cumulative effects of the *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park*, in combination with the effects of the security action, are limited primarily to parking. Both projects together will result in a quieter and more pleasant experience on the north side of the White House by removing parked or moving vehicles from Pennsylvania Avenue, Jackson and Madison Places, and H Street. The cumulative adverse effects will be primarily limited to the loss of parking in the vicinity of Lafayette Square. The planned removal of 60 spaces on Jackson Place will require the relocation of parking for individuals using permit parking on this street. The *EA for the Long-Term Design, Pennsylvania Avenue at the White House, President's Park*, does not state where new parking would be provided for these individuals, but sufficient commercial parking is normally available in nearby office buildings. This loss of parking, in combination with the net loss of 49 on-street parking spaces as a result of the security action, should not place an undue burden on overall parking capacity in the extended study area. The on-street parking is short-term, commercial-oriented parking that would not necessarily compete with long-term daily parking associated with the loss of permit-parking spaces on Jackson Place, that serve employees of the nearby office buildings.

2.11.2 Projects Outside the Extended Study Area

Two major projects are underway outside of but near the extended study area: the MCI Arena, which is under construction between 6th, 7th, F and H Streets, and the development of a new Convention Center at a preferred six-block location just north of Mount Vernon Square. The entertainment and special use nature of each of these projects, as well as their distance from the extended study area, indicates that there is little or no potential for cumulative adverse impacts when examined in relationship to the action to restrict vehicular access in the vicinity of the White House. Each project is discussed below.

MCI Arena. This arena, currently being constructed in the area bordered by 6th, 7th, F, and H Streets, will have a seating capacity of approximately 20,000 people. The arena will also contain retail, restaurant, and office space and host an estimated 200 events per year. The final environmental impact statement for the arena estimated that Pennsylvania Avenue in the vicinity of the White House, which is eight blocks west of the arena site, would accommodate less than 5 percent of the traffic generated by the arena. This east-west traffic, with the vehicle restrictions of the action now in place, would be shifted to H, I, and K Streets. Arena-generated traffic would largely occur after the P.M. peak traffic periods or during the weekends and is not expected to conflict with peak-period congestion. The spectators and other people attending events at the arena are expected to depend heavily on Metrorail, and on-street and garage parking in the area of the arena is expected to be sufficient to cover potential parking demand.

New D.C. Convention Center. The New D.C. Convention Center is a major development project being planned at a preferred location north of Mount Vernon Square (a second alternative site is also being examined at 2nd Street and New York Avenue, N.E., which is nearly two miles from the White House). The preferred site is bounded by K, M, 7th, and 9th Streets, Northwest, and is located 0.8 miles northeast of the White House. Although portions of 8th Street on the site would be closed, L Street would remain

open as a major westbound artery. The new convention center, which would contain approximately 2 million gross square feet of space, would replace the existing convention center located between 9th and 11th Streets on the south side of New York Avenue.

Although expected to be a major generator of traffic in the northwest quadrant of downtown Washington, D.C., the new convention center is sufficiently removed from the extended study area as to preclude major cumulative impacts on traffic. Traffic associated with day events at the convention center will be heavily linked to the hotels in the District. Many of the hotels that serve as major housing locations for large convention events at the new center are located along the Connecticut Avenue corridor or other locations in the northwest quadrant of the city north of Pennsylvania Avenue.

The east-west flow of traffic to and from the new center will be focused on K, L, and M Streets and along New York and Massachusetts Avenues. New York Avenue will serve as the primary link to I-395, the nearest interstate highway. None of these routes, except for portions of K Street more than one-quarter mile to the west, will be affected by traffic diversions caused by the security action. Cumulative adverse impacts are not likely to occur as a result of the security action in combination with construction and operation of a new convention center. With the closing of the existing convention center, which is located several blocks closer to the extended study area than the preferred site of the new center, any cumulative changes in traffic effects would most likely result in a lessening of traffic congestion in the area. The Washington Convention Center Authority is presently preparing a transportation management plan that will address access, parking, deliveries, traffic signals, traffic flow, and signs associated with the new convention center.